Livestock

CATTLE ON THE RANCH

Grades: K-2
Subjects: Language Arts, Vocational, Art
Montana Standards: Art 6, Literature1, Reading 4, Careers & Vocational Technical 1
Approximate Time: 1 week; 30 Minutes each day and ½ day for field trip

Objectives: Students will

- Become familiar with the terminology used in connection with cattle ranches and farms.

Materials Needed:

- The book Life on a Cattle Farm by Judy Wolfman
- Magazines with pictures of cattle.
- U. S. Beef Breeds poster from Ag in Montana trunk
- Video "Growing in the Country" from AMS Library

Keywords:
pasture-grazing land, crop land-land used to grow & harvest food for people or animals, summer range-owners lease, or permit land used to feed cattle in the summer, angus-black or dark red beef animal, Hereford-red with white face, crossbreeds-two different breeds (ie: Angus/Hereford) will be a black, white-faced calf, and other breeds)

Brief Description:

A cattle ranch is a large area of land where the cattle roam around to graze (eat) in the pasture. Calves are usually born in the state of Montana from January to April. Throughout the winter and spring the cows are fed good quality hay and need protection from the weather during this time of giving birth (calving). Births are usually single but sometimes a cow can give birth to twins. In late spring cattle are turned out to summer range, sometimes in the mountains and occasionally on the plains or valley pastures, to graze. It is very important to check these cows frequently throughout the summer. You must check for availability of water and salt as well as for any illnesses the cattle may acquire. Just before winter, there is a fall roundup. Cowboys (ranch workers) gather the cattle. There are different genders of cattle. A cow is a female who has had a baby (calf). The bull is a male who is the father of the calf. A heifer is a female who has not had a calf. A steer is a male who cannot father babies. In the fall the calves are separated from the cows and bulls. The calves are shipped to market where they are fed large amounts of hay and grain so that they will grow before they are butchered and processed into different cuts of meat and sent to the market for sale to the public. The cows are then separated from the bulls for the winter and each is fed hay for the winter. Beef cattle produce many different cuts of meat. Not only does it taste good, but also it provides energy. Beef is full of vitamins and minerals that your body needs every day. Montana raises about 2,750,000 head of cattle each year.

Almost the entire beef animal can be used to benefit man in some way. From a typical 1,000 pound steer, 400 pounds is used for beef that we eat and the remaining 600 pounds are used as by-products.

In this lesson students will be introduced to farm and ranch terminology. They will become aware of the workings of ranch life pertaining to cattle.

Lesson:

1. Read and discuss parts of the book Life on a Cattle Farm by Judy Wolfman.
   Go over terms related to farm and ranch life. (ie: cow, bull, calf, heifer, steer, cowboy, and beef)
2. Find and cut out different breeds of cattle. Place all of the pictures of Angus cattle on one sheet, all of the Hereford cattle on another sheet, etc.
3. Complete the work sheet appropriate for your grade level. There are two versions of the word find provided.
4. Sing Cattle song to the tune of Bingo. Words are attached.
5. Visit a local cattle ranch in your area.

Assessment:

Provide the students with a list of farm and ranch terms. Instruct the students to draw and label a picture of a cattle ranch.

TERMS TO BE PROVIDED:

pasture	water	cow
calf	bull	cowboy
fence	grass	ranch
farm	beef	hay

CATTLE SONG

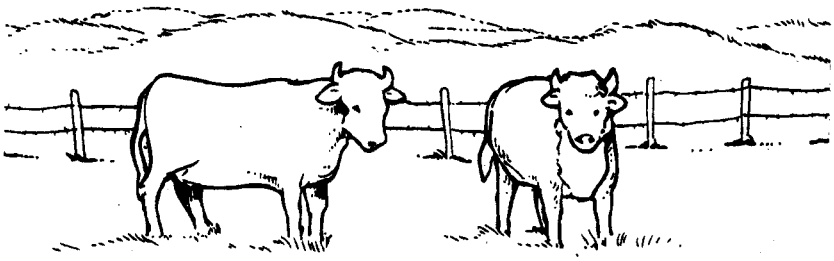
TO THE TUNE OF BINGO

The cowboy rode
Out on the range
And rounded up
The cattle
Cat tle
Cat tle
Cat tle
And rounded up the cattle.

LIFE ON A RANCH

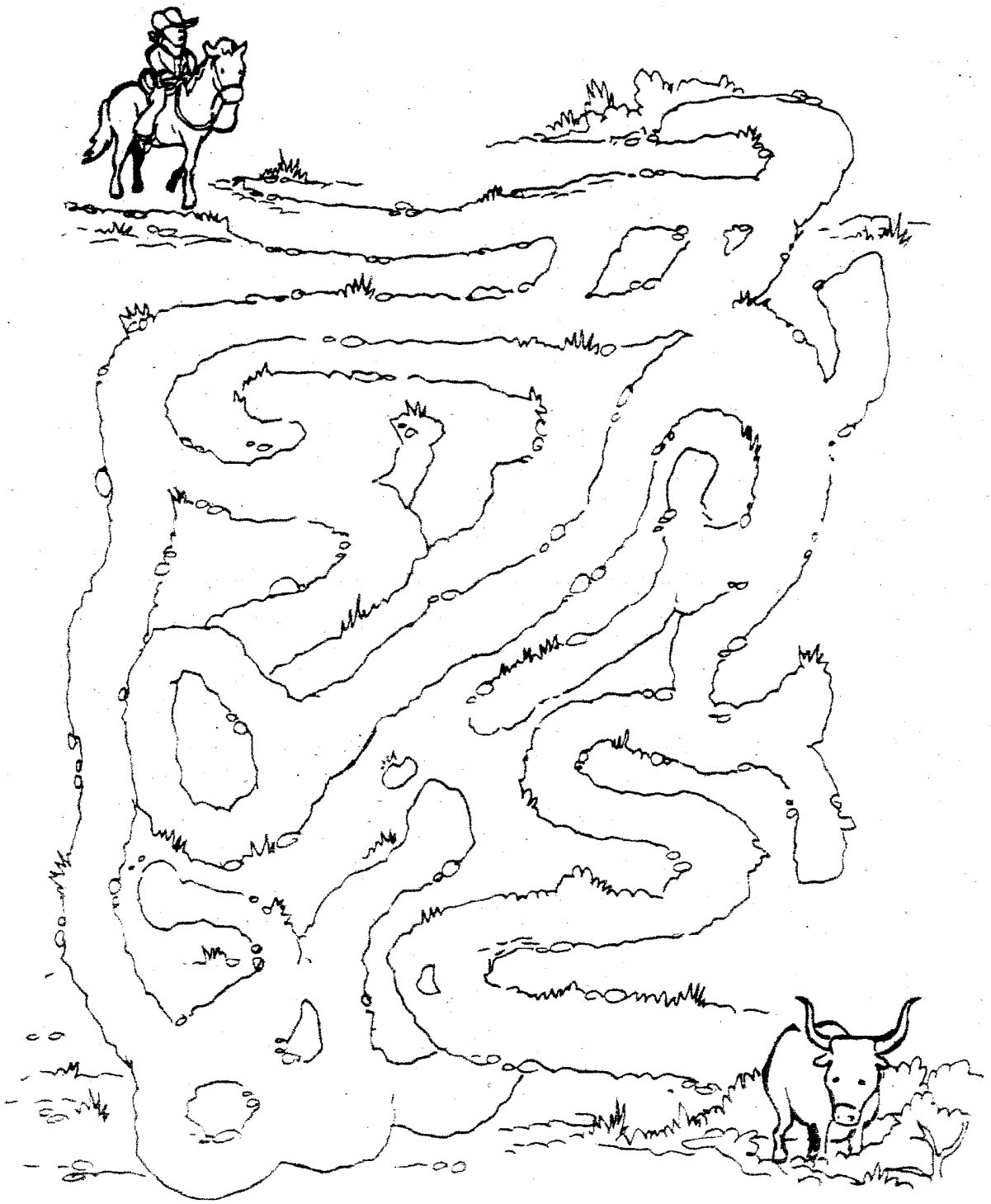
Y	O	B	W	O	C	P	Y	R	N
B	U	S	C	O	A	Z	A	O	N
U	E	O	S	S	C	R	H	Y	Y
L	L	O	T	A	W	A	T	E	R
L	U	U	H	E	R	B	L	L	Y
W	R	U	C	X	O	G	F	F	V
E	O	N	N	R	X	A	Y	Y	E
X	E	C	A	D	R	I	S	N	L
F	A	Y	R	M	F	E	E	B	D
A	R	J	E	K	H	L	L	G	T

BEEF	BULL	CALF
COW	COWBOY	FARM
FENCE	GRASS	HAY
PASTURE	RANCH	WATER



Name _____

Help Bronco Billy find the lost cow. Draw a green line to show him which way to go.



WE BUY BY-PRODUCTS

Grades: 2 & 3
Subjects: Science and Social Studies
Montana Standards: Social Studies 1, Science 6
Approximate Time: 4 days

Objectives: Students will

- Introduce term of by-product.
- Become aware of by-products of beef cattle
- Understand that almost every part of the animal is used in some way
- Show an understanding of "vertical", "horizontal", and "diagonal" while playing Bingo

Materials Needed:

- Beefo Bingo game board for each student
- By-products board pieces for each student
- Work sheet matching pictures and words
- AMS Treasure Chest Pamphlet: When a Cow is More than a Cow

Keywords:

By-product-anything made from beef animals other than meat
raw product- those materials that <u>have not</u> been processed
manufactured product-those materials that <u>have</u> been processed

Brief Description:

Almost the entire beef animal can be used to benefit man in some way. From a typical 1,000 pound steer, 400 pounds is used for beef that we eat and the remaining 600 pounds are used as by-products.

These are some common types of beef: pot roast, sirloin steak, ground beef, rib eye steak, and tenderloin steak. Beef is a good source of protein (which builds, maintains, and repairs body tissues), iron (which helps the red blood cells carry oxygen to body cells and tissues), zinc (which is a mineral used for growth and maintaining the immune system), and B-vitamins (which promote healthy skin, keep the nervous system healthy, and are important for digestion and metabolism).

Beef by-products are anything made from a beef animal other than meat. You probably use more beef by-products than you think! Here are some examples:

<u>Bone, Horn, Hooves, and Gelatin</u>
Combs, gelatin candy (Gummy Bears), marshmallows, mayonnaise, gelatin, photographic film, steel ball bearings, fine bone china, pet food, and vitamin capsules/gel coatings.

<u>Hide and Hair</u>
Insulation, paintbrushes, glue for bookmaking and band-aides, clothes, shoes, luggage, saddles, furniture, automobiles, volleyballs, basketballs, and baseball gloves.

<u>Fats and Fatty Acids</u>
Shampoo, soaps, shaving creams, cosmetics, deodorants, candles, crayons, floor wax, detergents, hydraulic brake fluid, plastics, insecticides, paints, perfumes, and synthetic rubber.

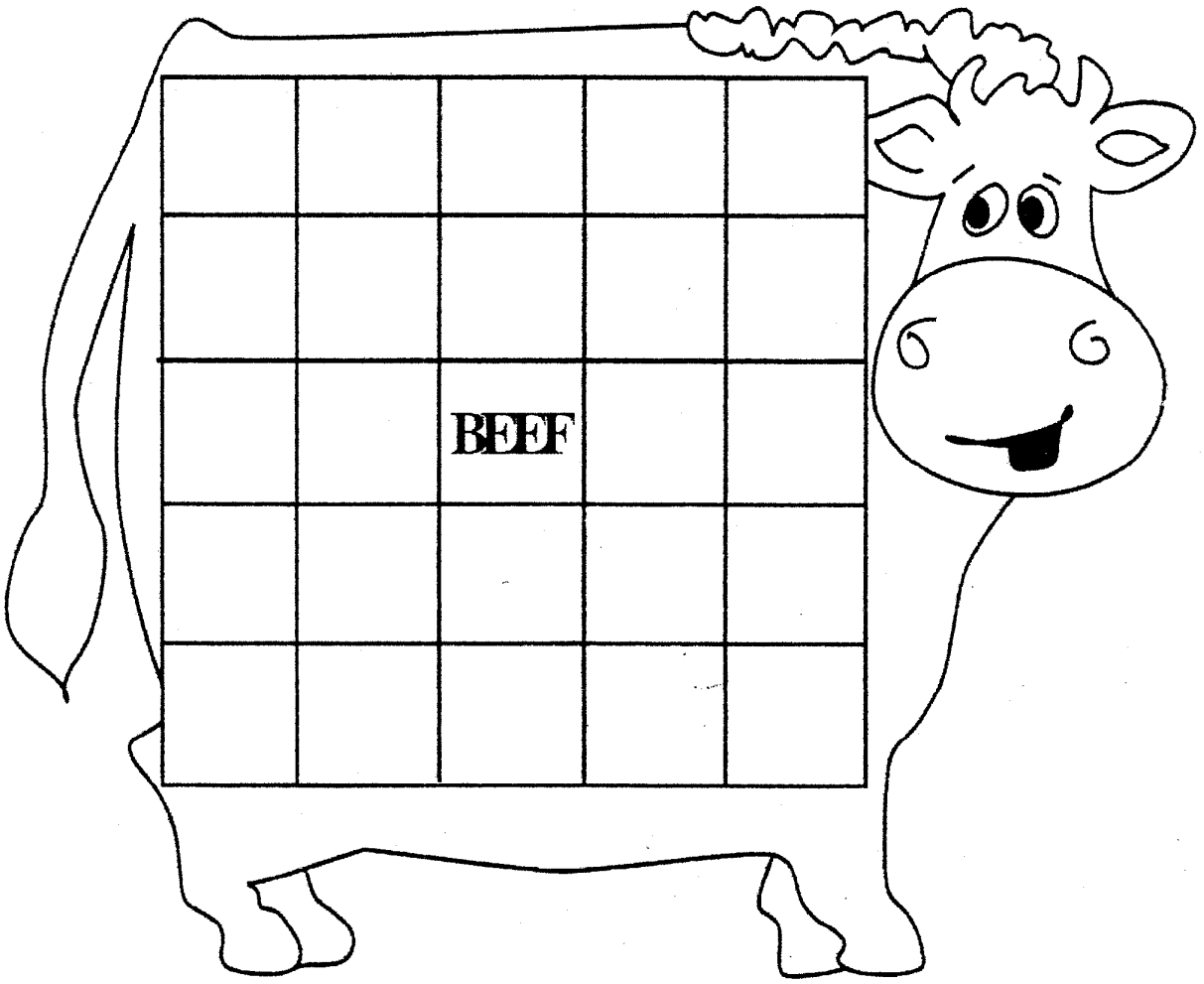
Lesson:

1. Teach the by-products from beef cattle. Discuss raw products being manufactured into the products we buy. Give students the by-products board piece sheet to discuss those specific products.
2. Cut out by-products board pieces. Choose 25 pieces to glue on to the Beefo Bingo card.
3. Play Beefo Bingo game.
4. Use the picture/word by-product worksheet.

Assessment:

Provide a very large outline drawing of a beef animal on butcher paper. Provide magazines for students to cut out pictures of by-products that were previously discussed. Paste these pictures on the outline drawing.

Beefo Bingo



To be used with Beef Bingo

By-Products Board Pieces

Insecticide	Paints	Brake Fluids	Machine Oil	Tires	Car Polish
Feed	Steel Ball Bearings	Cake Mix	Marshmallows	Pasta	Mayonaise
Floor Wax	Soap	Gelatin	Leather Chairs	Candy	Candles
Thread	Glue	Leather Shoes	Baseballs	Footballs	Basketballs
Cosmetics	Deodorant	Shoe Cream	Shaving Cream	Iron Pills	Insulin
Emery Board	Bandages	Luggage	Cellophane	Ceramics	Detergent
Textiles for car upholstery	Car Wax	Piano Keys	Paint Brushes	Perfume	Vitamine B_{12}
Bone China	Pet Food	Chewing Gum	Photographic Film	Oleo Margarine	Linoleum

Draw a line to match the correct picture and word. These products are each made from parts of a cow.

The Bones and Hooves help make:

Camera film

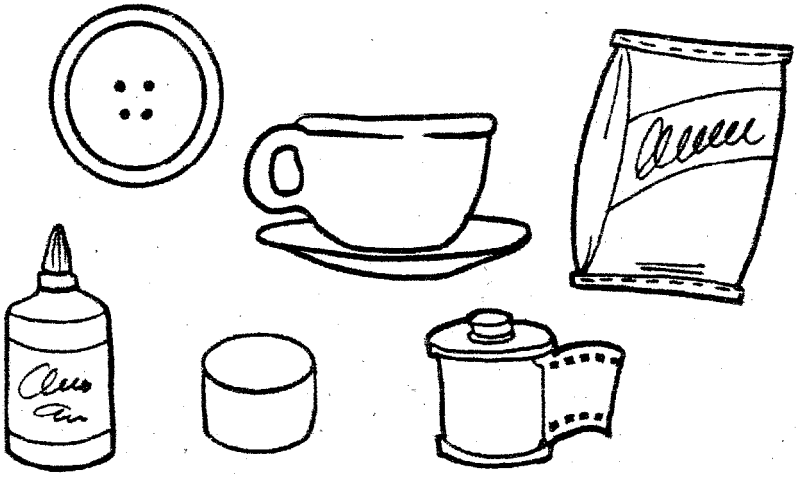
Buttons

Dishes

Glue

Fertilizer

Marshmallows



From the Hide and Hair we can make:

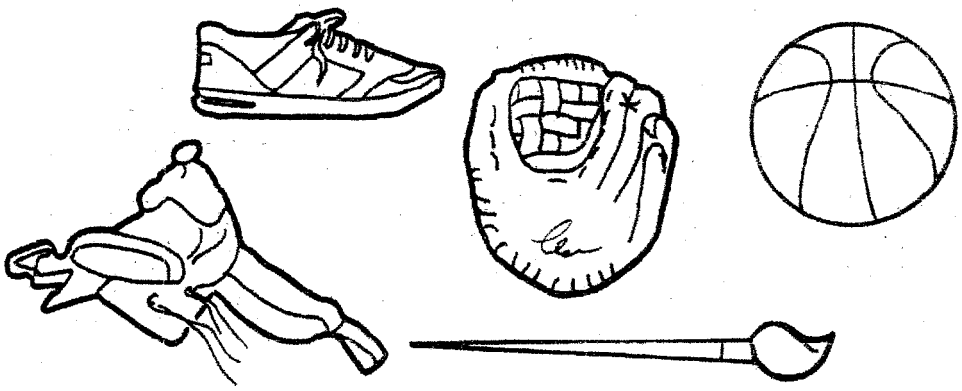
Baseball glove

Basketball

Paint brushes

Shoes

Saddle



Fats from the cow help us make:

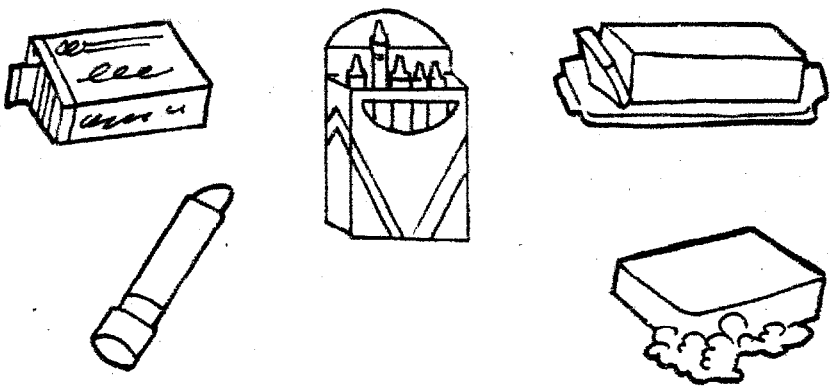
Crayons

Margarine

Soap

Chewing gum

Lipstick



HOW THE CHEESEBURGER FILLS A PYRAMID

Grades: 3
Subjects: Health, Language Arts
Montana Standards: Health Enhancement 1, Reading 1, Speaking & Listening 1
Approximate Time: 1 Day

Objectives: Students will

- Begin to understand the food groups of the food pyramid and how a cheeseburger fits into that pyramid.

Materials Needed:

- Poster of the USDA Food Pyramid
- Local Montana CattleWomen Group
- Small booklet BEEF IT'S WHAT'S FOR DINNER from the AMS trunk

Keywords:

Food pyramid, beef, condiments, nutritious

Brief Description:

Most burgers are made from ground beef and some kind of bread. Ground beef can be made from just about any part of a beef animal. Ground beef or ground sirloin has the least amount of fat. The average hamburger patty contains between 16 and 19 grams of fat. Ground beef is high in protein, containing 18 amino acids, eight of which are essential to human life. You can make your hamburger even more nutritious by choosing different breads and condiments. Whole-wheat buns add nutritional value.

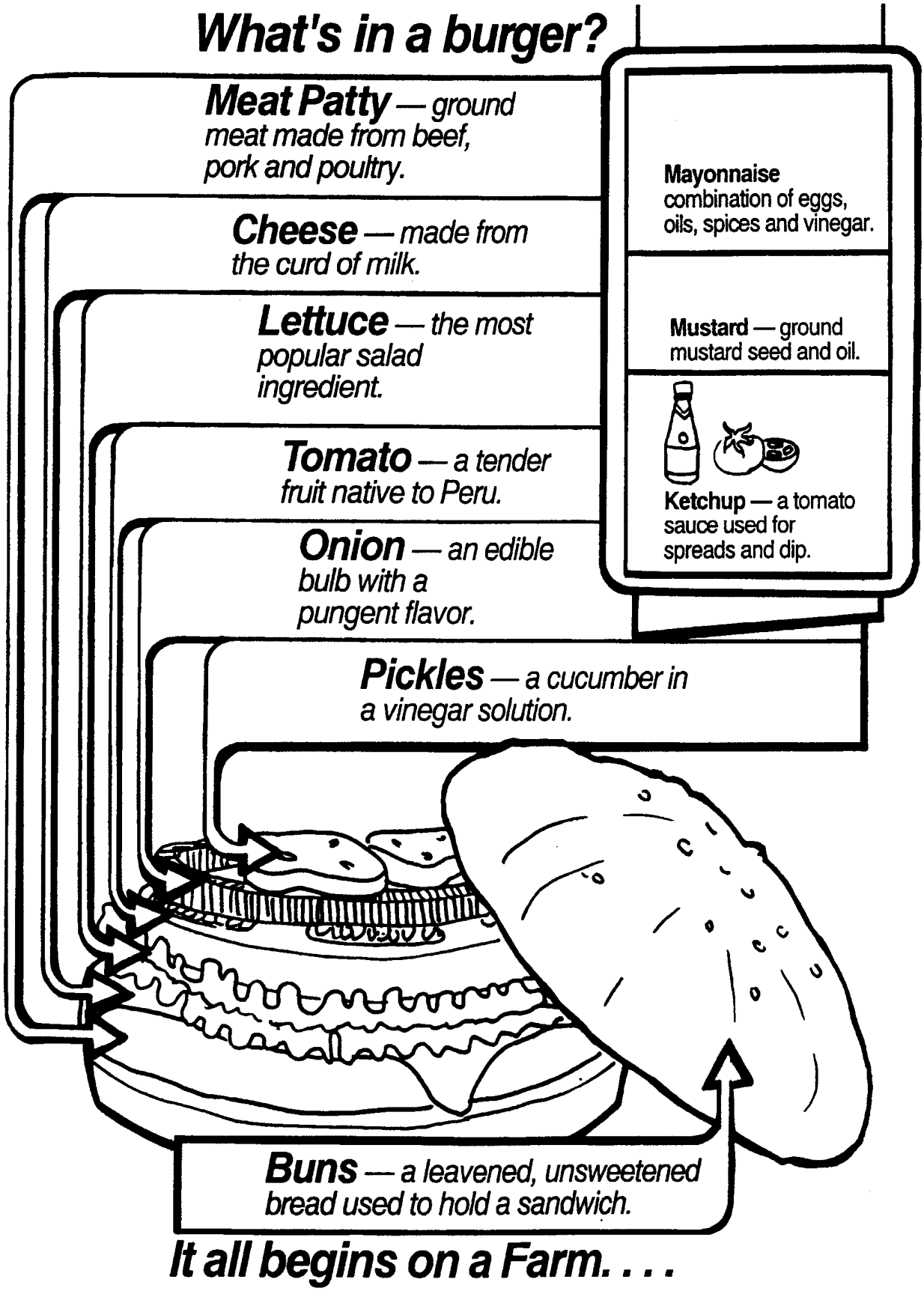
The average American eats about 64 pounds of beef each year, more than the people in any other country. Nearly one-half of that comes from ground beef and about one-fourth in the form of hamburgers.

Lesson:

1. In a group, with a large poster of the food pyramid, the teacher will introduce the sections of the pyramid. Then pass out the What's in a Burger sheet. Have a group discussion as to where all the condiments of the burger will fit into food pyramid. Children may color the What's in a Burger sheet. Referring to the last statement on this sheet (It all begins on a Farm) the teacher could lead a discussion about how each condiment was raised on a farm and tended by many workers and a farmer.
2. Arrange and invite a representative from the CattleWomen group to your school to present the Cheeseburger program to the class. Allow about 1 hour for this presentation.
3. Review the food groups and have children complete the Build a Burger worksheet.

Assessment:

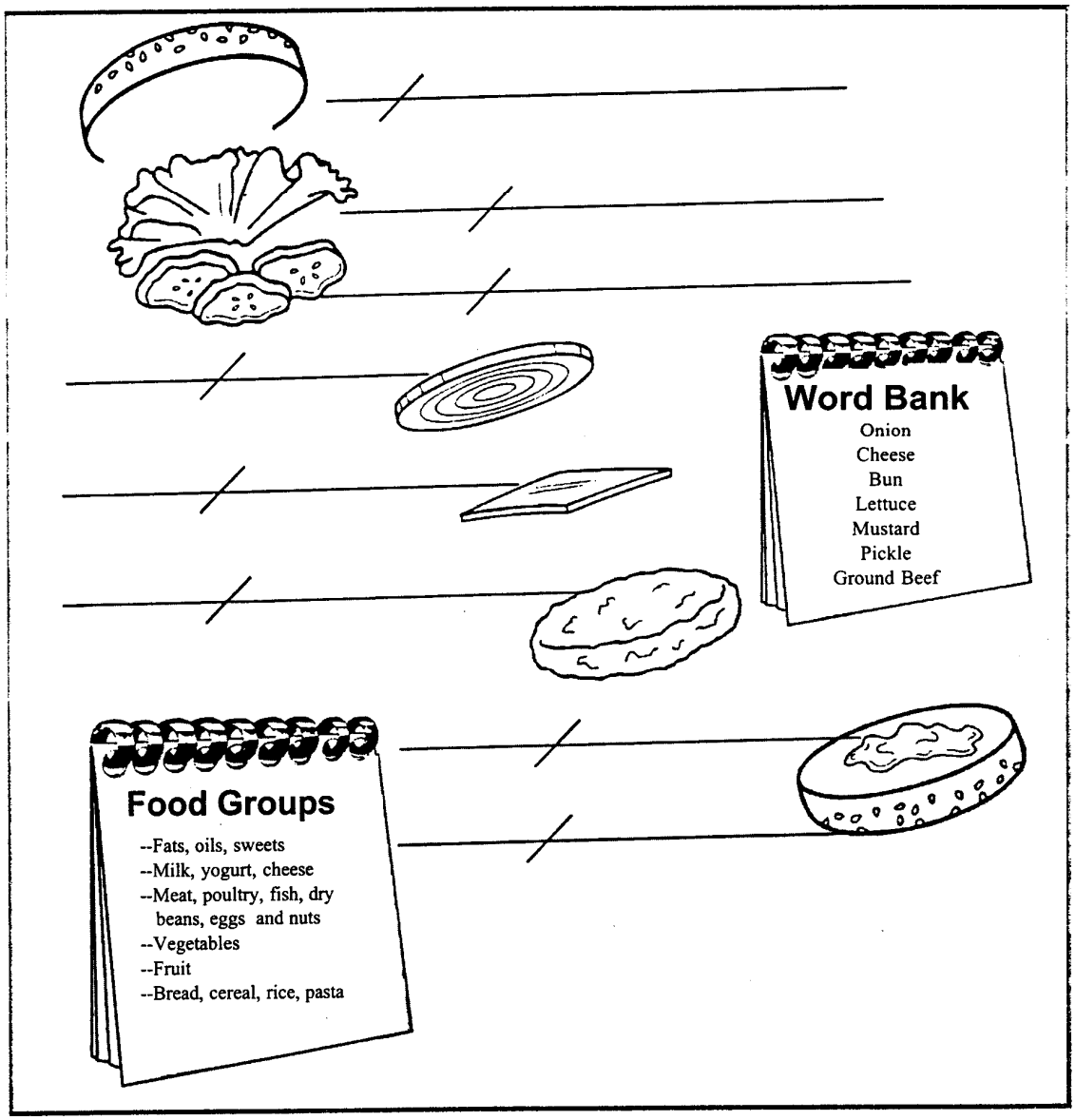
Give students the page with the food guide pyramid and the food group sheet. Have the students place the parts of the burger on to the pyramid by either drawing or writing the word.


What's in a burger?
Meat Patty — ground meat made from beef, pork and poultry.
Cheese — made from the curd of milk.
Lettuce — the most popular salad ingredient.
Tomato — a tender fruit native to Peru.
Onion — an edible bulb with a pungent flavor.
Pickles — a cucumber in a vinegar solution.
Mayonnaise combination of eggs, oils, spices and vinegar.
Mustard — ground mustard seed and oil.
Ketchup — a tomato sauce used for spreads and dip.
Buns — a leavened, unsweetened bread used to hold a sandwich.
It all begins on a Farm. . . .

Name _____

Build a Burger

Usually, a cheeseburger has products from all the food groups. Can you identify the parts of this cheeseburger? In the left blank, write the name of the cheeseburger part. In the right blank, list the food group it belongs to. Color the cheeseburger.



BURGER BUILDER

A V N Z C C L A M E T T N D C

R I Q M H M D S S U N R Z R O

C L S E I J Z I X M E Z T A Z

O U E E H C A L C O M R P T O

S S C F I N Q W S N N G J S N

E E Z U N T O M A T O E S U I

B O I O M B T B E A R I H M O

F U Y R M B L A P N I F D M N

N A R F F E E U P A V I N R S

M I E G T H H R V I N E G A R

H E A T E C C B U N E X N F T

B L U R T R A N S E L K C I P

N C U E G O G H E L R V Y K I

E M K P Y I X Z V R U I T V E

S E C I P S M N Y W F P V J W

BEEF
BUN
BURGER
CHEESE
CUCUMBER
ENVIRONMENT
FARM
FRENCHFRIES
GRAIN
KETCHUP
LETTUCE
MAYONNAISE
MONTANA
MUSTARD
ONIONS
PATTIES
PICKLES
SPICES
TOMATOES
VINEGAR

FIVE DAIRY COWS

Grades: K-3
Subjects: Science, Math, and Health
Montana Standards: Science 3, Math 6, and Health 1
Time: 45 minutes

Objectives: Students will

- Make finger puppets and participate in a finger play.
- Understand the importance of calcium in their diet.

Materials Needed:

- Variety of dairy products
- Plates
- Spoons
- Napkins
- Color crayons
- Tape
- Scissors
- Finger puppet patterns
- Five Dairy Cows finger play sheet

Keywords:

Puppet, dairy, products, survey, taste, texture, calcium

Brief Description:

Milk and other dairy foods – such as cheese, yogurt, and frozen yogurt – provide a lot of calcium and other nutrients. Foods that have a lot of calcium are good to eat as a snack or as part of a meal. Calcium is important because it aids in the development of strong bones and teeth and assists in muscle function. Adults need calcium to keep bones healthy. Insufficient calcium in the diet is one of the factors that may be associated with increased risk of a crippling bone disease called osteoporosis. Osteoporosis occurs when bones become so thin and brittle that they break easily.

Lesson:

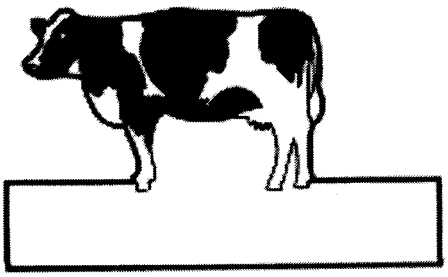
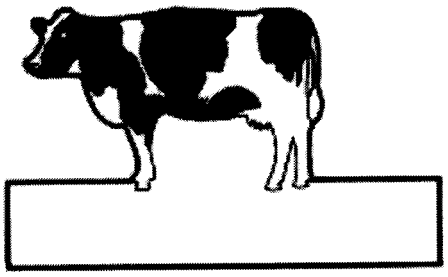
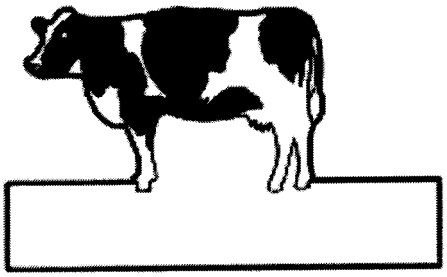
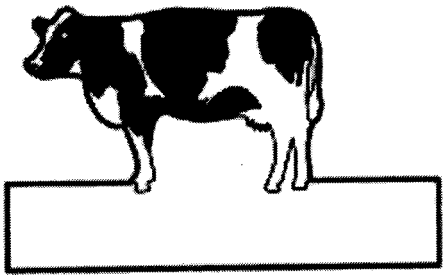
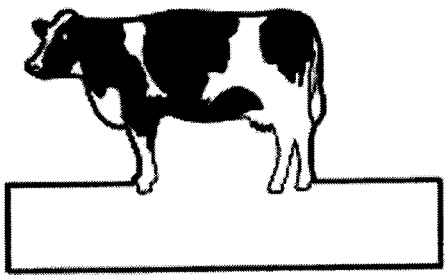
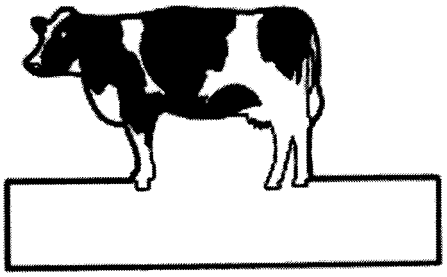
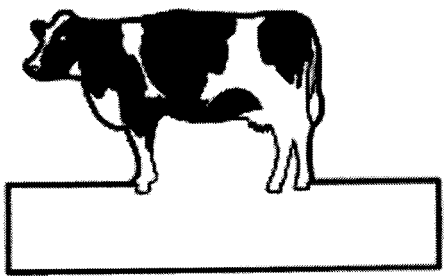
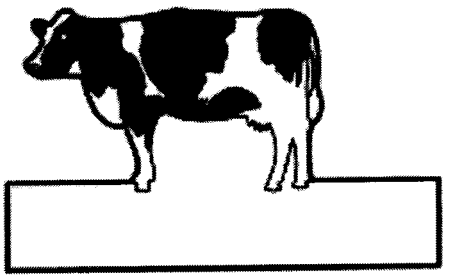
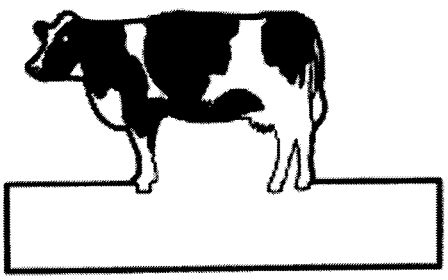
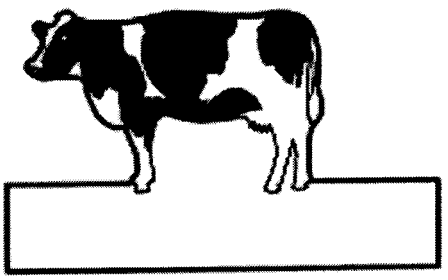
1. Place all of the cow finger puppets on one hand and five different dairy food puppets on the other hand.
2. Tell the students they are going to meet five special friends, and these friends want boys and girls to grow up to be strong and healthy.
3. Do the "Five Dairy Cows" finger play.
4. Give each student two finger puppet patterns- one cow and one dairy product. Have them cut, color and assemble the finger puppets.
5. Have the students identify what their dairy product is.
6. Repeat the finger play. This time, have students "pop up" their finger puppets at the appropriate time as you read the play.
7. After you're finished with the finger play have the dairy products on the table for the students to eat.
8. Take a survey. One the board make a chart; mark each column with the name of the food.
9. Ask students to raise their hand if they liked the food tasted. Have students help you count how many "likes" there are. Record the number in the column by using bars or pictures.

Assessment:

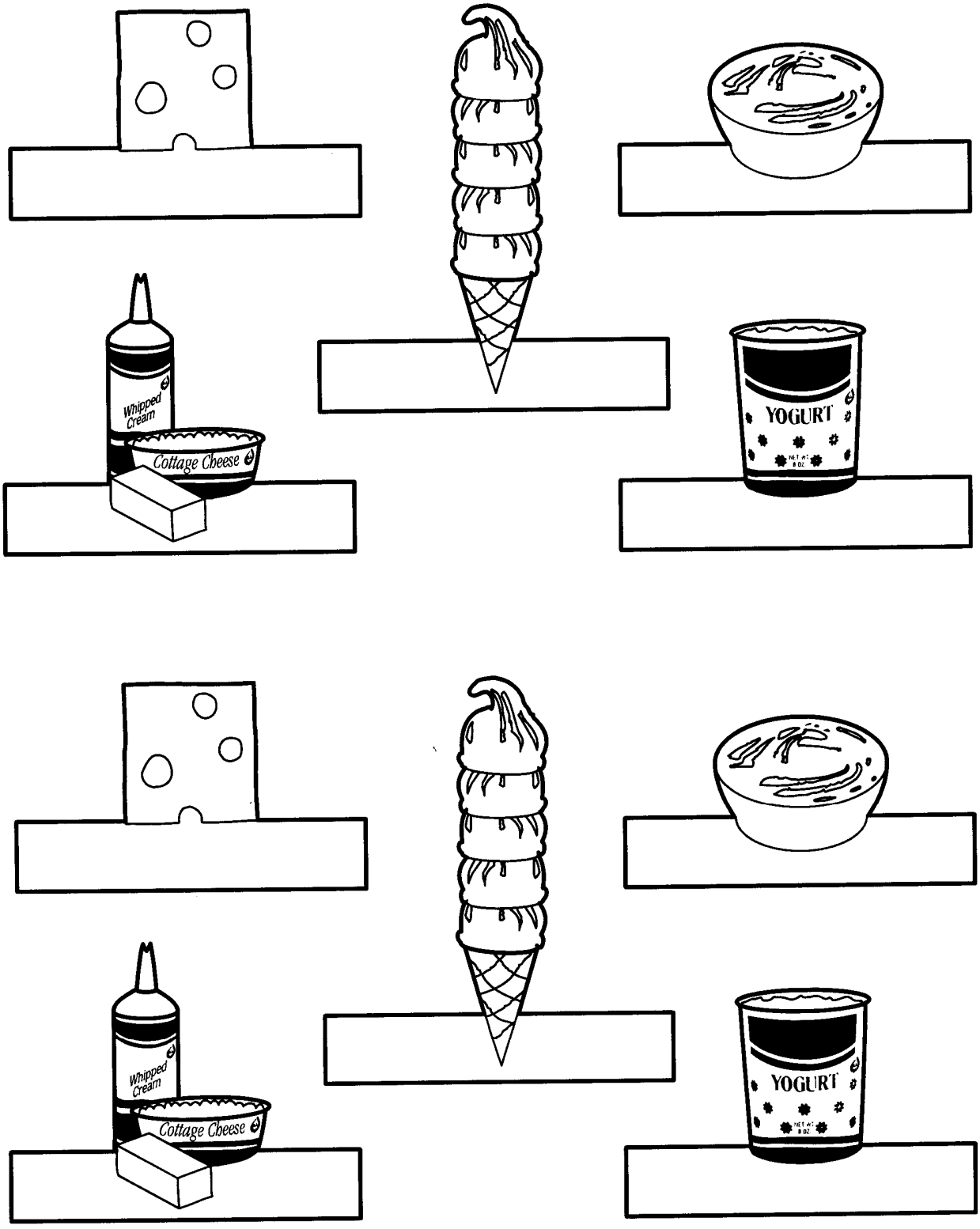
Discuss the chart, talking about how many more people "like" or "don't like" the food. Congratulate the students for taking a taste. Remind them that sometimes they will not like a new taste, and that's okay. What is important is for the students to be "food tasters" and to always give nutritious foods a try.

Resources: National Dairy Council

FINGER PUPPET PATTERNS

FINGER PUPPET PATTERNS



FINGER PUPPET PATTERNS

Five friendly dairy cows *Were eating ice cream cones,* *Trying to think of how to give* *All kids strong teeth and bones.*	Pop up all five dairy cows. Curl fingers toward each other and nod the heads, so it looks like the cows are talking with each other.
So the five friendly dairy cows *On a bright and sunny day,* *Planned a list of dairy treats* *To make without delay.*	Put the cows back down.
The first cow said, "With my milk *I'll make a tray of cheeses."*	Pop up the thumb cow. Pop up the cheese.
The second cow said, "With my milk *I'll make pudding! It always pleases."*	Pop up the pointer finger cow. Pop up the pudding.
"My milk," said a third cow, "will make *Cottage cheese, butter, and cream."*	Pop up the middle finger cow. Pop up the cottage cheese, butter, whipping cream.
"My milk," said the fourth cow, "will make *Yogurt that's like a dream."*	Pop up the fourth finger cow. Pop up the yogurt.
The fifth cow thought, and thought, and thought, *And then she thought some more,* *Finally she said, "With my milk,* *I'll make ice cream treats galore.* *I'll make vanilla, peach, and chocolate* *And of course some coconut,* *Strawberry and butter pecan,* *And finally some pistachio nut."*	Pop up the baby finger cow. Pop up the ice cream cone. Put the dairy products down.
The dairy cows went to sleep *And had dreams that were so sweet,* *Of girls and boys throughout the land* *With very strong bones and teeth!*	Have the cows stretch. Put the cows down.

USES OF MILK

Grades: K-3
Subjects: Science, Language Arts and Social Studies
Montana Standards: Science 2 & 3, Social Studies 6, Reading 1 & 4
Time: 45 minutes and 2 days for drying

Objectives: Students will

- Make ice cream.
- Learn about the folklore behind ice cream.
- Understand the industrial uses behind milk and make polymers.

Materials Needed:

- Small zip lock bags
- Large zip lock bags
- Plastic spoons
- Whole milk
- Sugar
- Vanilla
- Ice cubes
- Salt
- vinegar

Keywords:

Plastic, industrial, polymer, molecules, knead, rubbery, casein, monomers, chemical, characteristics, folklore, skeptical, freeze, history

Brief Description:

It is likely that ice cream was not invented, but rather came to be over many years. Here are a couple folklores to describe to your students how ice cream came to be.

Years ago, Charles I of England hosted a sumptuous state banquet for many of his friends and family. The meal, consisting of many delicacies of the day, had been simply superb but the "coup do grace" was yet to come. After much preparation, the King's French chef had concocted an apparently new dish. It was cold and resembled fresh-fallen snow but was much creamier and sweeter than any other after-dinner dessert. The guests were delighted, as was Charles, who summoned the cook and asked him not to divulge the recipe for his frozen cream. The King wanted the delicacy to be served only at the royal table and offered the cook 500 pounds a year to keep it that way. Sometime later, however, poor Charles fell into disfavor with is people and was beheaded in 1649. But by that time, the secret of the frozen cream remained a secret no more. The cook, named DeMirco, had not kept his promise.

The most popular story is of Marco Polo (1254-1324). He saw ice cream being made during his trip to China, and on his return, introduced them to Italy. The myth continues with the Italian chefs, Catherine de'Medici taking this magical dish to France when she went there in 1533 to marry the Duc d'Orleans, with Charles I rewarding his own ice-cream maker with a lifetime pension on condition that he did not divulge his secret recipe to anyone, thereby keeping ice cream as a royal prerogative.

In 1774, a caterer named Phillip Lenzi announced in a New York newspaper that he had just arrived from London and would be offering for sale various confections, including ice cream. Dolly Madison, wife of U.S. President James Madison, served ice cream at her husband's Inaugural Ball in 1813.

Commercial production of ice cream was begun in North America in Baltimore, Maryland, in 1851, by Mr. Jacob Fussell, now known as the father of the American ice cream industry. About 1926 the first commercially-successful continuous process freezer was perfected. The continuous freezer, developed by Clarence Vogt, and later ones produced by other manufacturers, has allowed the ice cream industry to become a mass producer of its product.

Milk is not only used to make ice cream but it has other uses as well, which are called industrial uses. The first plastics were made from natural sources such as milk, trees, and plants. Plastics are made through a process of polymerization. In this process, molecules called monomers combine with each other to form larger molecules called polymers. These unique man-made polymer chains give plastics their special characteristics.

Lesson:

1. Students will make a squeeze freeze or ice cream in a bag. The ideal setting for this part of the lesson would be outdoors.
2. 1 tablespoon of sugar and ½ teaspoon of vanilla can be added to the small zip lock bags, and also 1 tablespoon of salt to the large zip lock bags. This can be done prior to the start of the lesson if so desired.
3. Give each student a one of each sized bags.
4. Then add ½ cup of whole milk to the small bag.
5. Remove as much air from the bag as possible and seal the bag. It is important that each bag is sealed properly.
6. Have the students drop the small bag into the large bag with the salt in it. Add 18-20 ice cubes into the large bag. Remove as much air as possible and seal it properly.
7. Students should knead the bags about 10 minutes. When a soft ice cream is formed, remove the small bag from the large bag and give out spoons to eat the ice cream right out of the bag. **NOTE: It is important to use whole milk because other types of milk take too long to freeze. One pint of half and half can be added to a gallon of whole milk. This makes the ice cream richer and it will freeze faster.*
8. Read about the history of ice cream and you could bring and old fashioned ice cream maker to show the students.
9. Students will then make polymers.
10. Warm 1-cup of milk in a pan, do not scorch. Stir in 2 tablespoons of vinegar. Describe what happens.
11. Take the pan off heat and turn the stove off.
12. Take the substance out of the pan and wash it under running water. Shape it into objects such as marbles.
13. Set objects on wax paper on the counter; leave it out for a couple days to dry. Describe what has happened to the substance.

Assessment:

Explain to students how the vinegar and milk react to coagulate casein. Casein is protein molecules in milk, which are so long that they can bend, join to make the casein rubbery. As the material dries, the casein molecules shrink, making it hard.

For more on the history and folklore of ice cream read, “Chocolate, Strawberry, and Vanilla: A History of American Ice Cream” by Anne Funderburg, and “The Great American Ice Cream Book” by Paul Dickson.

GRASS TO MILK

Grades: K-3
Subjects: Science
Montana Standards: Science 3 & 5
Time: 1 hour

Objectives: Students will

- Understand were milk comes from and how a cow processes food to make milk.
- Learn about dairy farms.
- Become aware of the different forms of milk.

Materials Needed:

- Small carton of liquid milk
- Box of nonfat dry milk
- Cups
- Cow color sheet
- Cow diagram sheet
- Props—Mouth-tongs, Rumen-bag filled with confetti, Reticulum-ruler, Abomasum-sponge, Omasum-funnel, Small Intestines-small slinky, Large Intestines-large slinky, Bloodstream-paper heart, Udder-empty milk carton
- Grass to Milk Cards

Keywords:

mouth, rumen, reticulum, omasum, abomasums, small intestine, large intestine, bloodstream, udder, nonfat, dairy, organs, stomach, digestive, ferment, nutrients, organic, acid, enzymes, microbes, cecum, organisms, ruminant, fertilizer, butterfat, automated, technology

Brief Description:

Cows change grass and grains into milk. The dairy cow can do this because she is a ruminant, or an animal with four compartments to its stomach. Thanks to microbes that live in a cow's first two stomachs-the rumen and reticulum- a cow can digest plant materials that many other animals cannot.

The rumen and reticulum are two separate organs connected by a large opening through which food passes constantly. Since the two organs serve a single function they are often referred to as the reticulo-rumen. The microbes in these organs break down plant material through fermentation, releasing nutrients important for milk production.

Only particles under a certain size can then pass through a small opening leading to the third stomach, the omasum. The omasum recycles water and minerals and passes the food to the fourth stomach, the abomasums. The abomasums works much like the human stomach, secreting strong acids and enzymes to break down any undigested food.

As food then passes through the small and large intestines, it is further broken down, nutrients are absorbed and waste consolidated. The small pouch off the large intestine, known as

the cecum, contains microbes that ferment undigested food one last time to extract remaining nutrients.

The nutrients released by theses organisms are carried through the cow's body by the bloodstream. Some are delivered to the udder where they are transformed, drop by drop, into milk.

Unused material is passed from the cow in the form of manure. Rich in minerals and organic material, manure makes an excellent fertilizer for green grass. Not only does the cow provide us with nutritious milk, but it also can fertilize the grass that it eats to produce more milk.

Ruminants do not have any upper front teeth. They eat by wrapping their tongues around their food and pulling it into their mouths.

There are many different breeds of dairy cows and each breed varies in the amount of richness of milk produced. Some dairy farmers keep several breeds of cows in the herd in order to maintain a consistent quality of milk. Holstein-Friesian cows are large black and white cows. They produce the most milk, but the least butterfat. Holsteins are the most popular breed in the United States and adapt to all kinds of climates. Other types of dairy cows are Jersey, Guernsey, Ayrshire, Brown Swiss, and Milking Shorthorn.

The amount of milk a dairy cow produces varies from month to month. All dairy cows that produce milk are female and they cannot produce any milk until they give birth to their first calf. This occurs at approximately two years of age. A good milk-producing cow will give 20,000 to 30,000 pounds of milk per year.

We depend on Montana dairy farmers to give us milk we drink. There are approximately 650 dairy producers in the state and five processing plants, Bozeman, Great Falls, Billings, Kalispell, and Deer Lodge. On today's dairy farms, cows are milking two or three times a day with special automated milking machines. Automated equipment milks the dairy cows and carries the fresh milk to the cooler. The electric milking machine marked the end of the standard milking stool and the tiring job of hand milking by hand. With just two portable automated machines, a farmer can milk a dozen cows in one-fourth the time it use to take by hand.

Through product technology the usability of milk has been improved. In liquid form, milk can be stored in a refrigerator for several days. Milk, in powder or dry form, is made by removing fat and water. It has Vitamins A and D added to it and has a longer shelf life than liquid milk. Nonfat dry milk does not need to be refrigerated when stored in the powder form. Through the use of technology, milk production has been increasing for more than 25 years in the United States.

Lesson:

1. Ask the students for their impressions of the saying "You are what you eat". What happens to the food they eat once it is inside their bodies? Discuss the amazing transformation of food into the basic nutrients our body needs for growth and development. In the case of mammals, the food they eat can also be transformed into milk to feed to their babies.
2. Divide the class into nine groups. Explain that each group will represent a part of the cow involved in the transformation of green grass to the milk we drink. Using the cow diagram and background in information describe the dairy cows digestive system.

Older Students (#3-#6):

3. Pass out a Grass to Milk Card to each of the groups. Ask them to read their card carefully. Point out that the words in italics provide valuable clues to the function(s) of their part.
4. Show the students the nine packets of props (mouth, remen, reticulum, omasum, abomasums, small intestines, large intestines, bloodstream, and udder). Explain that they represent the various roles each of the nine parts plays in the milk-making process. Have groups select the bag of props that best matches the function of their part.

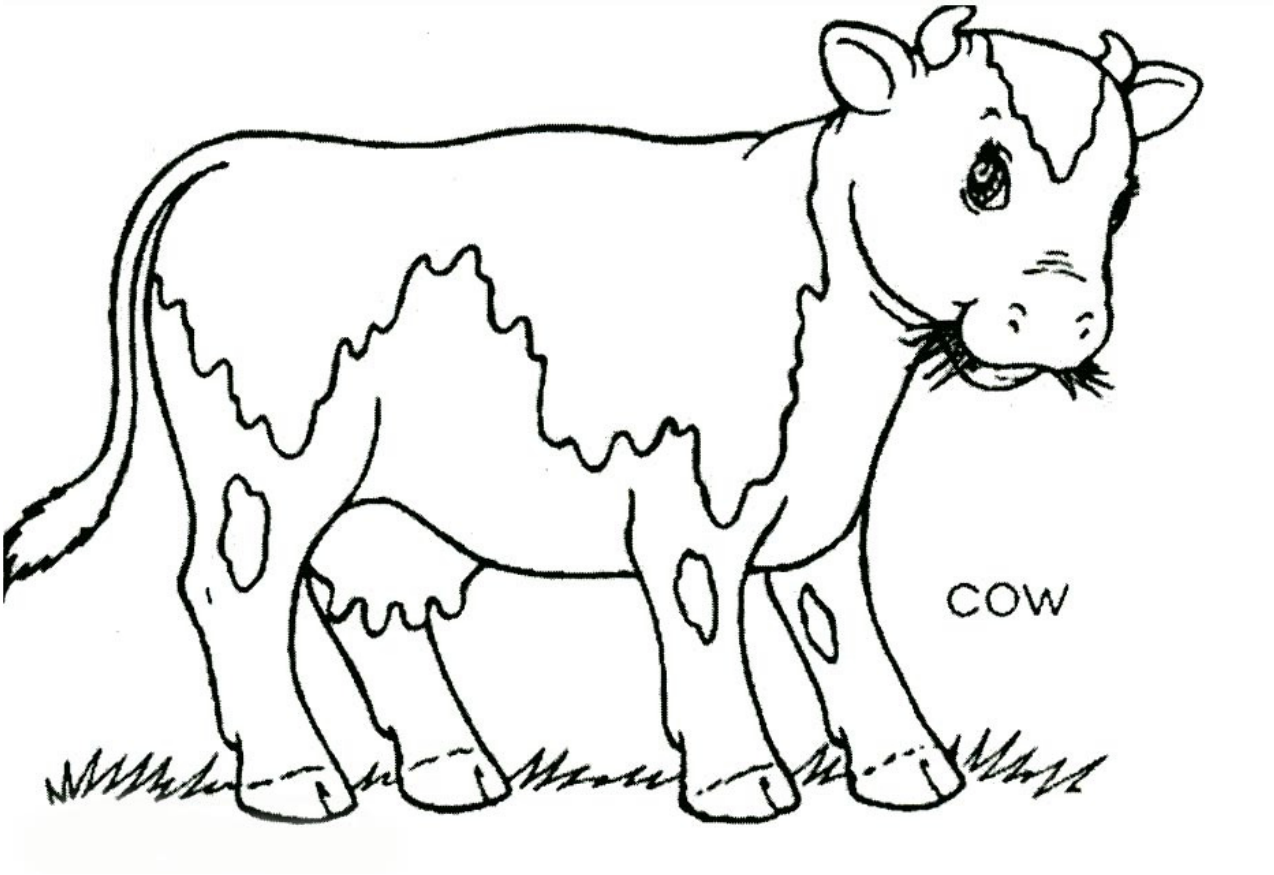
5. Now ask each group to select an answer card listing their identity. Before making their selection, encourage groups to share the information on their Grass to Milk cards with other groups. Point out those important clues may be found on cards held by their friends.
6. Now ask the groups to put their answer cards and props into the sequence of the grass to milk story. Remind the class that two end products are formed, so that at some point the sequence will branch.
7. Review the sequence giving each group a chance to describe and demonstrate their role in the milk-making process using the props.
8. Have the older students label the digestive system on the cow diagram sheet.
9. Begin a discussion of milk by asking where milk comes from, if it is a solid or a liquid, what kinds of containers it comes in, if it always has to be kept cool, etc.?
10. Show a box of nonfat dry milk. Read the pertinent information on the box.
11. Explain that through technology, powered milk was milk that had the water and fat removed, making the shelf life longer than fresh milk.
12. Make some milk from powder. Have the students come the taste of fresh milk and milk made from powder.
13. As a class list ways that powdered milk and fresh milk could be used.
14. List the advantages and disadvantages of liquid milk.
15. List the advantages and disadvantages of powdered milk.
16. Have the students color the cow their favorite breed. You could have students research or look up pictures to see what the different breeds of dairy cows look like.

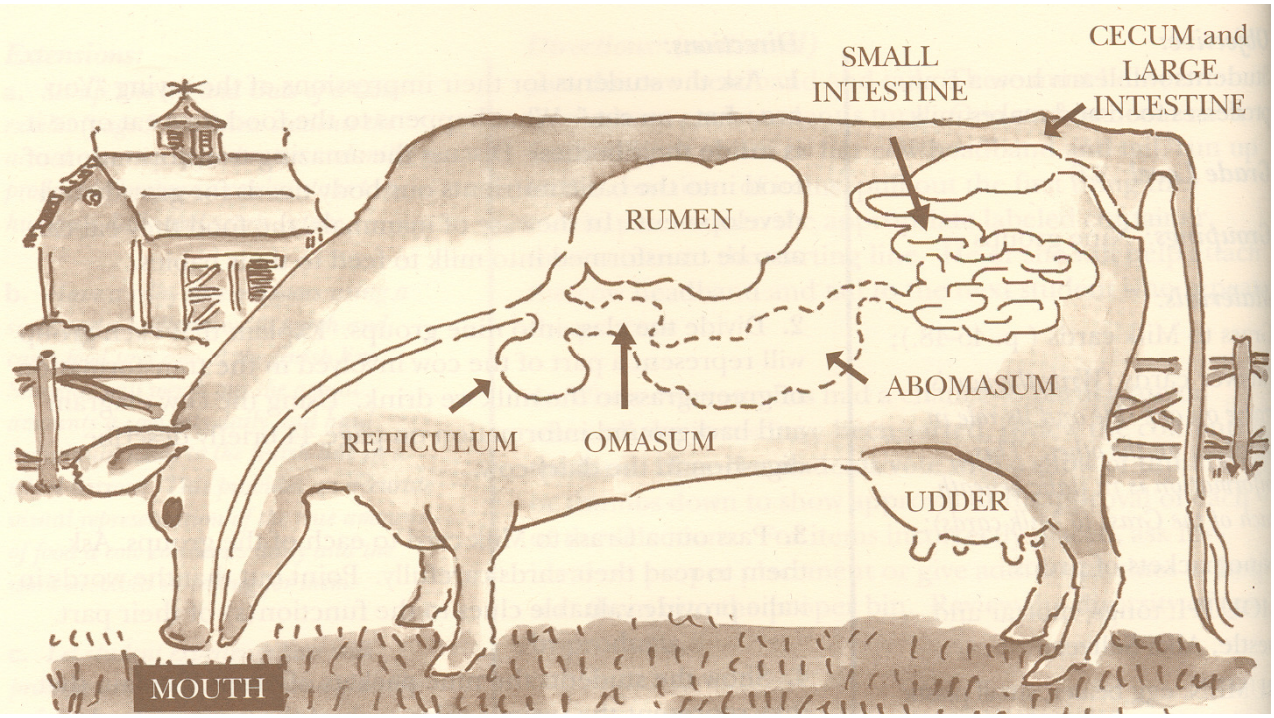
Assessment:

Students should understand how cows make milk. They should also understand that milk comes in a variety of forms and what those forms are. Students should complete the worksheets.

Resources:

Sheldon Farms Seasons: hands-on activities


COW


SMALL
INTESTINE
CECUM and
LARGE
INTESTINE
RUMEN
ABOMASUM
RETICULUM
OMASUM
UDDER
MOUTH

Grass to Milk Card

Cows are notorious for eating on the run. While out grazing in the field they use a strong muscle to grab vegetation and swallow it whole! Then they move on to the next clump. Later the cow burps up a ball of food, called a bolus or cud, which it then chews and chews. Cows can spend up to eight hours a day chewing their cud or ruminating. The food is ground up and mixed with a white foamy froth. This froth acts like an antacid to keep the acidity level in the first stomach, the RUMEN just right for digestion.

What am I?
How do I begin the digestive process?

Answer: *I am the MOUTH. I grab food with my tongue, grind it up with my single set of bottom teeth, and buffer it with my saliva.*

Grass to Milk Card

I am a very large organ and can hold up to 25 gallons of food. Most of the vegetation a cow eats comes to me looking much like it did when it was growing in the field. I work like a large fermentation vat along with my partner in digestion, the RETICULUM. We have a whole colony of microscopic organisms living inside of us that breaks down tough plant fibers without using oxygen! My muscles work to mix, moisten, churn and blend the food with these microbes. Important nutrients are then released and absorbed by the bloodstream. They are a major energy source for the cow and are important in milk production.

What am I?
What is my role in digestion?

Answer: *I am the RUMEN. I blend and churn food, while a bacterium inside me breaks the food down through a process called fermentation. Important nutrients are then released and absorbed by the bloodstream.*

Grass to Milk Card

The true stomach sends digested food and waste my way. More nutrients and water are released and absorbed through my walls into the bloodstream. I expand and contract to move the leftovers along my twisting path to my larger neighbors and relations, the CECUM and LARGE INTESTINE.

What am I?
How do I begin function?

Answer: *I am the SMALL INTESTINE. I absorb remaining nutrients and pass them into the bloodstream. By expanding and contracting I move leftovers along my long twisting path.*

Grass to Milk Card

The SMALL INTESTINE passes its leftovers to me. These are fermented by bacteria in the CECUM and any remaining nutrients and water are absorbed through my walls into the bloodstream. I expand and contract to move the remaining unusable material to the end of the line. It comes out as cow manure, rich in minerals and organic matter. It fertilizes the green grass that can then be turned into more milk.

What am I?
What is my role in digestion?

Answer: *I am the LARGE INTESTINE and CECUM. I expand and contract to keep unusable food moving along. The cecum, a small pouch like extension, with its associated bacteria, ferments the leftovers one last time and any remaining nutrients and water are absorbed. The final product is manure, a rich fertilizer.*

Grass to Milk Card

I take all the nutrients absorbed from the RUMEN, RETICULUM, OMASUM and ABOMASUM and carry these throughout the cow's body. Think of me as a mass transit system, powered by a strong muscular pump that keeps nutrients moving continuously along. In a mother cow, I deliver important nutrients to the UDDER where they are used to make milk for her new calf.

What am I?
What is my main function?

Answer: *I am the BLOODSTREAM. My heart pumps the blood, which is important nutrients throughout the cow's body.*

Grass to Milk Card

When a cow has a calf I kick into action to feed the little tyke. The BLOODSTREAM delivers nutrients through tiny capillaries to each of my four chambers. Within these chambers, milk-making alveoli use the nutrients to form milk, drop by drop. It takes 50-70 hours for a cow to turn green grass into white milk.

What am I?
What do I do?

Answer: *I am the UDDER. I make and store milk until the calf or farmer milks it out.*

BEE BODIES

Grades: 1-3
Subjects: Science
Montana Standards: Science 2 & 3
Approximate Time: 45 minutes

Objectives: Students will

- Understand the physical characteristics of the three different types of honeybees.
- Understand the functions of each type of honeybee.
- Label or cut and paste on the worksheet.

Materials Needed:

- Worksheets
- Glossary of terms

Keywords:

Characteristics, queen, drone, worker, wax, abdomen, thorax, pollen, stinger, proboscises, nectar, colony, glands, sac, mandible, ocellus, antenna, midgut, ventriculus, caste

Brief Description:

There are three types of adult bees that make up a honeybee colony. Each type of honeybee has a slightly different body depending on the tasks they perform. The great majority (about 99 percent) of adult honeybees are sterile female worker bees. The worker bees are the smallest of honey bees. They have long proboscises used to suck up nectar from flowers. Worker bees' hind legs are fringed with stiff hairs that form pollen baskets. Workers have a stinger and a poison gland at the tip of their abdomen. Typically, worker bees can only sting once because their stingers and internal organs are pulled out when they sting and they die. Drones, the male members of the colony, are somewhat larger than the workers. They have rounded abdomens, huge compound eyes, and powerful wings. Drones do not have long proboscises and must be fed by worker bees. They also do not have stingers and therefore cannot defend themselves. Drones do not have wax-secreting glands. The drones only purpose is to mate with the queen. Mating takes place in the air. The queen bee is the largest of the honeybees. She has a long abdomen, a shiny thorax, and does not have pollen baskets on her legs. The queen has a stinger, which she uses to fight off other queens. She may sting multiple times without dying.

Lesson:

1. Work through the first worksheet as a group by labeling the parts of the honeybee. Have younger students cut out the list of words and past them to the correct parts. Discuss where each part goes, referring to the glossary of terms.
2. Once the students understand the parts of a bee, they can work on the second worksheet describing the three types of honeybees.

Assessment:

Discuss and ask the students questions. Why can't drones gather their own food? Why can't drones defend the colony? Why can worker bees usually only sting once? What would happen to a honeybee colony if there were no queen? What would happen to a honeybee colony if there were no drones?

GLOSSARY OF HONEYBEE TERMS

Antenna(e)—the moveable, sensitive feelers on an insect's head which detect odor and movement.

Beebread—a mixture of nectar and pollen. Fed to worker bees and drones in their larval stage.

Bee metamorphosis—the four stages of transformation in the life of a honeybee.

Brood—the offspring produced by the colony (eggs and larvae).

Cell—a hexagonal chamber built of beeswax for brood rearing and storage of honey and pollen.

Cocoon—the silk chamber a larva spins around itself just prior to the pupal stage of development.

Compound Eye—an eye made up of thousands of tiny lenses that allow a honeybee to see ultraviolet light, which is invisible to the human eye, as well as visible light (except red).

Drone cell—a brood cell that is larger than the normal worker brood cells and in which the queen deposits drone eggs.

Egg—laid by a queen bee, this is the first stage in the life of a honeybee.

Exoskeleton—the hard outer covering which forms a bee's body.

Head—the forward body region of the honeybee's three sections that contains the compound eyes, simple eyes, antennae, mandibles, and proboscis.

Honey sac—the stomach-like organ that is connected by a funnel shaped valve to the digestive tract. The nectar stored here will be unloaded into empty hive cells or passed on to house bees for food.

Larva—hatched from the egg the queen bee lays, the larva will pupate and eventurally turn into an adult insect.

Legs—a honeybee has three pairs of segmented legs used not only for walking but also to dust off antennae, brush pollen out of the thousands of branched hairs that cover the body, and to store pollen.

Mandible—located on either side of the honeybee's head, these jaw-like structures are used to chew honey and pollen, and to knead wax.

Midgut or ventriculus—the stomach section in the abdomen which digests food.

Nectar—a sweet liquid secreted by flowers of various plants.

Ocellus—simple eye with a thick lens that can sense changes in the brightness of daylight.

Porboscis or tongue—a straw-like structure used for sucking nectar or honey.

Pollen—the fine, powder-like material produced by the anthers of flowering plants.

Pollen basket—a smooth, somewhat concave surface of the outer hind leg that is fringed with long, curved hairs that hold the pollen in place.

Pupa—the third stage in a bee's life, during which the larva's body changes into that of an adult.

Royal jelly—a milky, yellow syrup that is very high in protein, that young worker bees secrete from glands inside their heads and feed to larvae.

Stinger—found in a chamber at the end of the abdomen (in female honeybees only) and is used to defend against intruders.

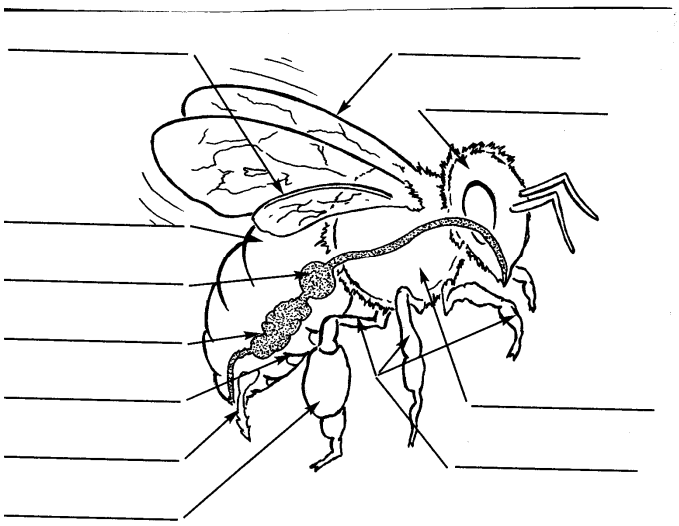
Thorax—the middle section of the honeybee's three sections that contains the flight muscles, the wings and six legs.

Wax gland(s)—four pairs of glands that are specialized parts of the body wall. During the wax forming period in the life or a worker, they become greatly thickened and take on a glandular structure. The wax is discharged as a liquid and hardens to small flakes or scales.

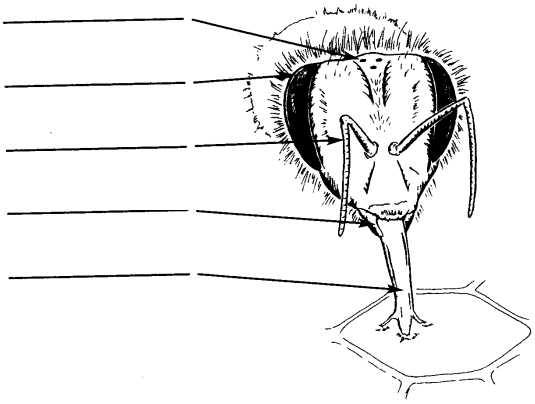
Wings(s)—the honeybee has two sets of flat, think, membranous wings, strengthened by various veins. The fore wings are larger than the hind wings.

The Honeybee Body

Label the honeybee body parts.



Abdomen
Fore wing
Head
Hind wing
Honey sac
Legs
Midgut or
ventriculus
Pollen basket
Stinger
Thorax
Wax gland

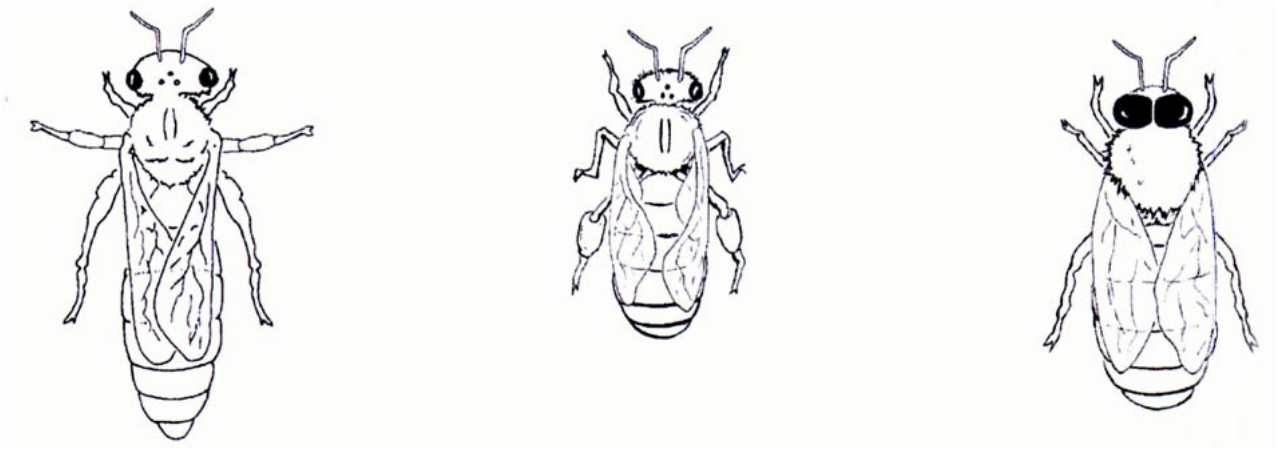


Antenna
Compound Eye
Mandible
Ocellus
Proboscis or tongue

Members of the Hive

Honeybees are social insects and live in groups called colonies. Within each colony there are three types or castes of honeybees: the queen bee, worker bees, and drones. Name three distinct features of each caste of honeybee.

Queen	Worker	Drone
_____	_____	_____
_____	_____	_____
_____	_____	_____



HONEY BEE PHEROMONES

Grades: K-3
Subjects: Science, Math
Montana Standards: Science 3, Math 1
Approximate Time: 2-30 minutes class sessions

Objectives: Students will

- Learn about pheromones and how honeybees use them to communicate.
- Be able to identify different smells.
- Count by 7's.

Materials Needed:

- Camera film canisters
- Peppermint extract, vanilla, banana, vinegar, cinnamon, clove
- Cotton balls
- Honey stick for each student
- Blindfolds
- The Honey Files: A Bee's Life by National Honey Board
- Honeybee Path worksheet

Keywords:

Pheromone, sense, colony, hive, queen, drone, smell, behavior, communicate, scent

Brief Description:

Introduce the students to the idea that honeybees have senses but that they are much different from human senses. For example, bees can see many colors but they cannot see red. Humans on the other hand can't see ultraviolet light, but honeybees can. Humans and bees also perceive odors differently. Humans use their noses to smell, while honeybees use their antennae to detect pheromones, which are chemicals they emit in certain situations.

Lesson:

Day 1

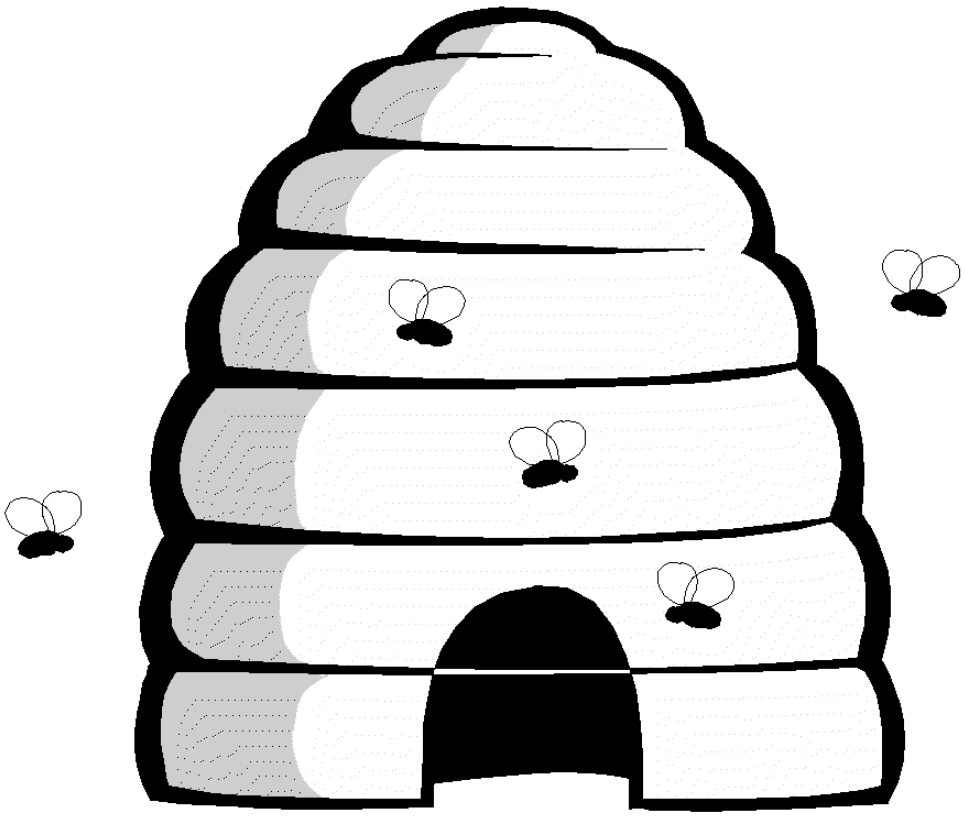
1. You can incorporate the video The Honey Files: A Bee's Life by National Honey Board.
2. Place each scent in a different canister, fill the canisters with cotton balls, and close the lid to keep the odors from escaping.

Day 2

3. Make a maze in the classroom out of tables, desks, and chairs.
4. Hide honey sticks around the room.
5. Give out one scent of each that you have made in the canisters. If you have five scents, pick out five students to have each scent. These are your queen bees.
6. Place the "queen bees" throughout the maze in your classroom.
7. Randomly give out the rest of the scents to the other students, and blindfold them.
8. Have all the students take off the lid to their canisters and smell.
9. Make sure the students can only find what hive they belong to by matching their scent with the queen's scent.
10. After everyone has found their hive, have them take off their blindfolds and look around the room. Make comparisons and have discussion about the end result.
11. Have the students hunt for the honey sticks that have been hidden around the classroom as a treat. **Make sure that you do not have a student with honey allergies!**
12. Students can complete the Honeybee Path worksheet for their math lesson.

Assessment:

Students should have reached their hive by using their sense of smell. Students should understand that each bee hive has a unique smell: the odor a queen uses to attract drones, the alarm pheromone that signal hive members to defend the hive, and the queen pheromone that maintains behavioral control of the colony.



Begin at 7, count by 7's mark each square until the bee reaches the hive.

Path to the Beehive

THE BUSY BUZZY BEE

Grades: 1-3
Subjects: Science, Math and Social Studies
Montana Standards: Science 3 & 5, Math 6, Social Studies 1 & 6
Approximate Time: 45 minutes

Objectives: Students will

- Realize the importance of bees to food production and the interdependence of plant and animals.
- Be able to recognize the three different types of bees and their importance.

Materials Needed:

- Arm or head bands
- Colored paper strips
- Bags

Keywords:

Pollination, blossom, queen, drone, worker, colonies, nectar, stamen, pistil, fertilize

Brief Description:

Bees are an integral part of agriculture. Plants are wind pollinated; bird or other insect pollinated, or hand pollinated by man, bees are very important for most of our fruit and nut crops and vegetables. Bees are crucial during periods of blossoming.

Lesson:

1. Ask students to tell you what they know about bees and why bees are important to people.
2. Explain that honeybees are insects that live in colonies. In the colony there are three kinds of honeybees: queen, drone, and worker.
3. Explain the process of pollination.
    a. Why do bees visit flowers? What do they get from a flower? (Nectar and pollen)
    b. What does a bee get on its legs and body hair when it flies into a flower to get its nectar? (Pollen)
    c. Pollen from one another is transferred onto the bee because of its movement.
    d. What happens when a flower or apple blossom is pollinated? (Pollen is transferred from the stamen, the male part of the flower, to the pistil, the female part of the flower; it sets things in motion for fertilization to take place so seeds or fruit can be produced.
    e. What would happen if the blossom or flower didn't get pollinated? (No seeds would be produced.)
4. Each student plays a role of a fruit tree, a buzzy bee, or the producer.
5. Students can wear arm or head bands to separate the bees, producers and trees.
6. Each tree holds 30 strips of colored paper in one hand (one color per flower) and a bag in the other.
7. Each buzzy bee buzzes to a tree, picks a strip of the paper and flies to the next tree. Drops the strip into that trees bag and picks a strip from that tree.
8. One minute represents one growing season. Allow only one minute for the bees to fly from one tree to the next. On the designated signal, the bees return to their hive, leaving their paper strip in the bag of the last tree.
9. The tree producer asks the trees to count the number of paper strips in their bag. The strips will represent the number of fruit they can grow on their tree for the season. After each tree counted its strips, have the trees tell the producer its total.

10. Play the game several times. You can change the conditions. The weather could be cold, windy, or a virus killed many bees, the hive was over crowded bees left the hive.
11. A graph can be made to show the results.

Assessment:

Students should be able to understand how important bees are for pollinating different plants. Students should also be able to tell the difference between the different kinds of honeybees. For more references: The Amazing Bee by William Fox and the video The Honey Files: A Bee's Life by National Honey Board.

WHAT KIND OF HORSE ARE YOU?

Grades: K-3
Subjects: Math, Language Arts, Social Studies
Montana Standards: Math 5, Social Studies 4-6, Literature 1
Approximate Time: 2-30 minutes class sessions

Objectives: Students will

- Learn about horses and their usefulness to farmers before tractors became replaced them.
- Demonstrate an understanding of measurement by measuring classmates with a tape measure and recording their height.
- Know how to read a chart.

Materials Needed:

- Tape measure
- What Kind of Horse are you worksheet
- Horsepower: the Wonder of Draft Horses by Cris Peterson

Keywords:
Measurement, breeds, mare, foal, stallion, gelding, machinery, harness, pony, hands, labor, wither, height, equipment, training, recreation, pleasure

Brief Description:

Horses have been useful animals for thousands of years. Horses are great for working and running. They have strong teeth, sharp ears, keen eyes, and a good sense of smell. A horse has larger eyes than any other land animal except the ostrich and the two eyes can move independently. A horse can look forward with one eye and backward with the other eye. They have wide nostrils to help them breathe easily and also have long, muscular legs that give them strength to pull loads and run at fast speeds.

There are more than 150 breeds and types of horses and ponies. These various breeds are divided into three main groups: light horses, heavy horses, and ponies. Light horses have thin legs, small bones, and weigh less than 1300 pounds. Heavy horses have large bones, thick, sturdy legs, and weigh more than 2000 pounds. Ponies are small horses that stand less than 58 inches high when full grown and weigh less than 800 pounds.

Horses are measured in a unit called *hands*. One hand equals four inches. The horse is measured from the ground to the highest point of the withers. The withers are the ridge between the shoulder bones.

Foals are newborn horses. The foal is either a colt, which is a male less than four years old, or a filly, which is a female less than four years old. Foals are able to stand shortly after they are born and within a few hours they can run about. A mare is a female horse that is more than four years old. A pregnant mare will carry her foal for about 11 months. A stallion is a male horse that can be used for breeding and a gelding is a male horse that is not able to be used for breeding.

In the "good old days" a farmer would have to keep as many as six teams of horses for farm labor. That meant spending an hour each morning just to feed and harness the horses before going to work in the fields or feeding. It took another hour at the end of the day to put the horses away. Since these "machines" came without headlights, a farmer couldn't work after the sun went down, not to mention the fact that the machines would eat as much as one fifth of the crops for energy. You'd think with all that animal labor a farmer would have more than enough help. But during heavy harvest times, as many as 20 extra people might be needed to help do the work on a 440-acre farm.

It would be nice if that was the way things happened. But, like most revolutions, the change from horses to mechanical horsepower was slow to catch on. Tractors were first introduced in the Midwest around the 1900's. But those first machines were cumbersome, inefficient, steam-operated vehicles. It wasn't until the middle 1930's that tractors improved enough to really replace mules and horses as a labor source.

It was this second generation of tractors, along with other machines and farm equipment, which helped pull American agriculture through those grim days of the Depression, into the most efficient and productive industry the country had ever seen. Like other industries in this country, agriculture has benefited from many improvements in technology. It's not accident that today's farmer can farm more land, and produce more food more efficiently, than ever before.

Horses are still important in agriculture; particularly in the western U.S. horses are still used on cattle ranches for roping and branding cattle and for carrying cowboys through rough country to help round up the herds. Horses are also used in non-agricultural settings. In larger cities, horses are used by police to patrol busy areas which are often clogged with traffic. Horses are also used for recreation and pleasure. Some people use horses which are bred and trained for specific purposes, horse racing, polo, cutting, reining, etc.

Lesson:

Day 1

1. Discuss general horse information and the transformation from "horse power" to tractor power.
2. Read the book Horsepower: the Wonder of Draft Horses by Cris Peterson.

Day 2

3. Explain to students how horses are measured.
4. Divide the students into groups of two.
5. Have the students take turns measuring one another in inches. The students should measure each other from the ground to the top of their shoulders, like horses are measured. The students should then take this number and, with the teachers help, divide it by four to find out how tall they are in hands.
6. Have the students locate their height in hands from the chart on the worksheet. The students will then discover what type of horse they are.
7. Once the students figure out what type of horse they are, have them research this horse. The students can find where the horse originates, the classification of their horse (light, heavy, pony), what their horse is known for (racing, pulling, roping, etc.), how much their horse weighs, and what color their horse is. The students should show a picture of their horse, if possible. The teacher should tailor the presentation to each grade level.
8. Have the older student's research farm machinery. Create a timeline of when each machine was invented and how it has improved.

Assessment:

Students should understand the importance of horses in agriculture through the centuries and the units used to measure the height of the horse. Encourage students to read books about horses, My Horses by Heather Miller, Leah's Pony by Elizabeth Friedrich.

BREEDS USED IN THIS LESSON

Shetland Pony

A traditional and popular mount for children in the USA, this hardy little (9.2 to 10.2 hands) dark-colored, thick-coated pony originating in the Shetland Islands of Scotland is a gentle and easy to train worker, capable of pulling twice its weight in driving harness.

Ponies of America—Pony of the Americas (Appaloosa)

These western-type ponies are smaller (14.1 and less) versions of the colorful Appaloosa breed of stock horse. Used mostly under western tack, they are popular for pleasure and show competition. Their color coat is the typical spots and blankets of the Appaloosa.

Hackney Pony

One of the most popular driving breeds in the world, the Hackney Pony (14.1 hands or less) and the Hackney Horse (15.1 hands) are known for their spirit, their refinement and their high stepping action. Both are dark-colored, with high tails and smallish heads also held high.

Quarter Horse

The classic horse of the American cowboy and still used by ranchers today, the short-coupled, heavily muscled and gentle Quarter Horse is a descendant of the Thoroughbred and a popular family horse. Versatile for both pleasure and competition.

Thoroughbred

Long selected only on the basis of soundness, speed and stamina, and one of the first to close its stud book, the Thoroughbred is the world's preeminent race horse. Originated in England around 1700, the breed has both tall distance runners and short-coupled sprinters.

Belgian

A draft breed originating in Belgium of great weight and traction power, usually chestnut and known for a good temperament, strong constitution and being a willing worker. The heaviest recorded horse (3,400 pounds) was a Belgian, who died in Iowa (USA) in 1948.

Name: _____

What Kind of Horse are You?

Use a tape measure to measure a classmate's height.

Inches	Hands	Horse
36-44.8	9-11.2	Shetland Pony
44.8-52.8	11.2-13.2	Pony of the Americas
48-56.8	12-14.2	Hackney Pony
56.8-61.2	14.2-15.3	Quarter Horse
60-68	15-17	Thoroughbred
64-76	16-19	Belgian

1. How tall are you?

   Inches _____ Hands _____

2. What kind of horse are you?

3. How tall was the classmate you measured?

4. What kind of horse is he/she?

A HORSE OF COURSE!

Grades: K-3
Subjects: Science, Social Studies, and Language Arts
Montana Standards: Science 3, Social Studies 3, and Writing 1
Approximate Time: 45 minutes

Objectives: Students will

- Research a specific breed of horse.
- Learn different information about their horse and report it orally or in writing-by-writing their report on the horse outline.
- Complete the horse breeds worksheet.

Materials Needed:

- Osborn's Horses Book
- Internet access
- Horse outline
- Word search worksheet

Keywords:

Eocene, Eohippus, Dawn Horse, ancient, Pliohippus, livestock, research, breeds

Brief Description:

Horses belong to a group called equine or equus. Equine is the scientific name given to the horse. Equus comes from the ancient Greek work meaning "quickness". This group consists of horses, ponies, mules, burros, zebras, and donkeys.

Horses can be traced to the Eocene period somewhere around 50 to 60 million years ago. Eohippus, or Dawn Horse, was about the size of a cocker spaniel-14 inches at the withers and weighed about 12 pounds. He had four toes on his front feet and three on the back. The first truly single-hoofed horse was Pliohippus, which evolved 7 million years ago.

There are more than 350 different breeds of horses and ponies. The average life span for the horse is between 20-25 years. The oldest recorded horse was an English barge horse; his name was "Old Billy", who lived to be 62. Some of the most popular breeds of horses are Quarter Horses, Thoroughbred, Arabian, Appaloosa, Tennessee Walking Horse, and the Morgan. The breed of horse that a person decides to buy depends on how they are going to use the horse. Quarter Horses are preferred by people who work with cattle and have cow sense. Thoroughbreds are prized for their showing, racing, and jumping abilities. Draft horses such as the Belgian, Clydesdale, Shire, and Percheron are used for pulling equipment and heavy loads. These are known as the "heavy" breeds that can weigh up to 1600 pounds and are at least 16 hands high.

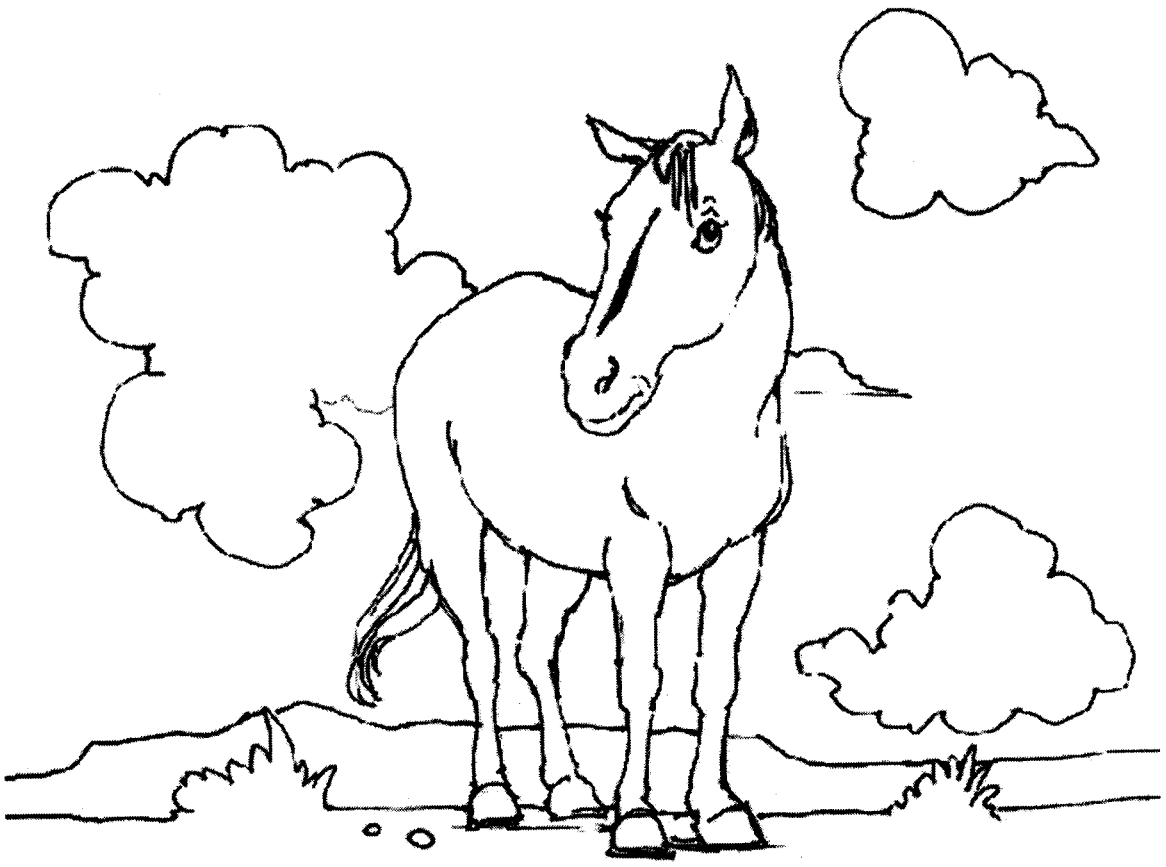
In 1999, Montana had around 130,000 head of horses in the state. You can see a more current statistic count from the website: http://www.nass.usda.gov/mt. Click on Livestock and then click on Other. A lot of ranches still rely on horses to do specific jobs. The Quarter Horse is used extensively on ranches to gather, move, and brand cattle.

Lesson:

1. Have the students research about a specific horse breed, using library resources and the Internet. Have them orally present the information they found on their horse. For the older students use the horse outline to write a short report of their horse.
2. Have the students complete the word search worksheet.

Assessment:

http://www.ansi.okstate.edu/breeds/horses/ Information about horse breeds.
http://www.horseworlddata.com/breed.html Description of the different horse breeds and organizations.



HORSE BREEDS

E H R N A G R O M C
V A E R I H S P L M
A C T R X Y I Y B L
O K R B M N D D E N
D N A L T E H S L A
H E U O S R C T G I
O Y Q D P O H N I B
R W A L K E R I A A
S L I P I Z Z A N R
E A S O O L A P P A

APPOLOOSA
ARABIAN
BELGIAN
CLYDESDALE
HACKNEY
HORSE
LIPIZZAN
MORGAN
PAINT
PINTO
QUARTER
SHETLAND
SHIRE
WALKER

THE FEED BAG

Grades: K-3
Subjects: Science and Health
Montana Standards: Science 3, Health 1 & 7
Approximate Time: 45 minutes

Objectives: Students will

- Understand the importance of the nutrition that horses need.
- Make treats for a horse.
- Make treats for themselves.

Materials Needed:

- Flour
- Oatmeal
- Eggs
- Brown sugar
- Applesauce
- Vegetable oil
- Molasses
- Hot water Zip-lock bags
- Blueberry jellybeans
- Candy corn
- Granola
- Shredded Wheat
- M&M's
- Cheerios
- Horse shaped cookie cutter

Keywords:
Mustang, nutrition, forage, hay, acres, protein, carbohydrate, recipe, graze, ingredients, vitamins, minerals, cecum

Brief Description:

Discuss with students the importance of nutrition and that it is the same with animals. Domestic horses require much more care than other livestock. Wild horses, or mustangs, are able to survive without human care. However, as man has tamed the horse, he must also take care of it. Horses eat grass, hay, grain, and pellets. Horses that are kept inside all the time eat mostly hay and grain. Horses kept outside eat grass during the spring, summer and fall, and are fed hay in the winter. They also require a lot of water. On an average day of 70 degrees, an adult horse will drink 11 gallons of water.

Horses are not able to digest food very well, so they must have high quality feed. Horses have a cecum which is attached to the small intestine where the food must go through to be processed. Although they are able to eat roughage like cattle and sheep, they do not have four stomachs to efficiently digest it. This is why horses eat all the time. They must eat only small amounts throughout the day in order to get the nutritional value from their feed.

If you would allow a horse to graze unrestricted and eat every bit of edible grass, your land could become a weed patch with miniature dust storms in the summer and muddy bogs in the winter. By being aware of grass facts and horse sense, you can prevent this problem. Here are some of the facts: One horse needs about 825 air dry pounds of hay or forage per month, or about 5 tons of hay per year. A horse needs supplemental feeding on grazing land to correct deficiencies

in protein or other essential nutrients in native forage. A horse needs grain in his diet when he is worked regularly. Horses graze plants completely to the ground leaving little opportunity for regrowth. Horses are very mobile. They seldom lie down unless they are very young or very old. Consequently, in moving about they usually "tramp out" as must or more forage than they eat, particularly when confined in a small enclosure. The smaller the acreage, the greater the destruction of the vegetation if horses are allowed to graze continually, even when ample hay is supplied. Horses confined to small acreages are more susceptible to parasites, diseases and boredom. They should be examined by a veterinarian at least once a year.

Lesson:

1. Have students make homemade cookies. Follow the Horse Cookie Recipe.

   Ingredients:

4 cups flour	1 egg
3 cups oatmeal	4 tablespoons brown sugar
¾ cup applesauce	4 tablespoons vegetable oil
1 cup hot water	½ cup molasses

   Directions: Preheat oven to 300 degrees, and grease a baking sheet. Mix oatmeal, flour and brown sugar together. Then mix in egg, vegetable oil, applesauce and molasses. Add hot water and mix well. Roll out dough to ½ inch thickness on a floured surface. Cut out shapes using cookie cutters (horse shape). Place cookies on baking sheet and bake for one hour. Take out and let cool.

2. Have the students then make their own feed sack. Horses eat and drink water, corn, oats, hay, sugar beet pulp, and bran. These foods provide the horse with their nutritional needs. (Water, corn-protein/carbohydrates, oats-protein/vitamin B, hay-protein/minerals, vitamins, sugar beet pulp-carbohydrates, bran-protein/carbohydrates.) Take a zip-lock bag and add water-blueberry jellybeans, corn-candy corn, oats-granola, hay-shredded wheat, sugar beet pulp-M&M's, and bran-Cheerios.

Assessment:

Students should understand the basic nutrition of a horse and connect with the nutrition of humans.

BEE LEAF IN THE LEAFCUTTER BEE

Grades: K-3
Subjects: Science & Math
Montana Standards: Science 1 & 2, Math 1-2, & 5
Approximate Time: 1 week

Objectives: Students will

- Become aware of leaf cutter bees and their role in optimizing alfalfa seed production.
- Become aware of the life cycle of the leafcutter bee.
- Understand the design of a brood cell.

Materials Needed:

- Gallon jar
- One cup measurers
- Small navy beans-several bags
- Shoe box (representing the nesting blocks)
- Toilet paper rolls cut in half horizontally-1/2 for each student-teacher tape one end closed
- Green tissue paper to be torn in small pieces(represents leaves cut by the bees)
- Yellow cotton balls (representing the pollen
- Blue Play dough(representing nectar)
- Rice (representing the egg)
- Green circle of paper the size of the paper tube
- Slide show from www.insectclopedia.com downloaded to a CD or disk by the teacher

Keywords:

Leafcutter bees, nesting block, pollen, nectar, egg, capping, cell, incubation, dehumidification, alfalfa seed, pollination, larva, mature, hatch

Brief Description:

Alfalfa is a major crop in Montana, which ranked eighth in the U.S. in alfalfa hay production and third in acreage in 1997. In 1997, Montana also had 12,000 acres intensively managed for alfalfa seed production. Efficient commercial seed production often depends upon successful management of alfalfa leafcutting bees. Alfalfa leafcutting bees are the major commercial pollinator of seed alfalfa in western North America, although they were introduced to the United States (accidentally) just over 60 years ago. Some estimates indicate that each female bee can pollinate enough flowers to produce a quarter pound of seed. The alfalfa leafcutter bee, about half the size of the honey bee, is black with white-yellowish bands on the abdomen. Female alfalfa leafcutting bees are termed “solitary bees” because each builds her own nest, consisting of a sequence of brood cells in a straight line within an existing cavity. For each larva, the adult female builds a capsule-shaped cell constructed of semicircular or circular leaf pieces cut from alfalfa or

other plants. In nature, the cavity used for nesting may be something like a tunnel created by a beetle emerging from a log. Fortunately, females will readily accept artificial nest boards and so can be induced to nest in high densities at the edge of alfalfa fields. For example, for a five acre field, one shelter, containing 28 nesting blocks, is positioned on the edge of the field. The home range of a leafcutter bee is approximately ¼ mile from there nesting block. The alfalfa should be in the early stages of bloom when the bees are released.

After the nesting blocks have been provided, female leafcutter bees collect fragments of leaves to construct individual nest cells. The bees cut leaves in a very distinctive manner, making a smooth semicircular or circular cut from the edge of leaves about the size of a pencil in diameter. However, leafcutter bees do not eat the cut pieces of leaves that they remove. Instead, these are carried back to the nest and used to fashion nest cells within the previously constructed tunnels. Each leaf-lined cell is then provisioned with a mixture of nectar and pollen. An egg is then laid and the cell sealed, producing a finished nest cell that somewhat resembles a cigar butt. A series of closely packed cells are produced in sequence so that a finished nest tunnel may contain numerous cells. The young bees develop and remain within the cells, emerging the next season.

In the late summer, on irrigated acreage; the water is discontinued, forcing the alfalfa seed to mature. At this time the nesting blocks are removed from the field. These blocks are taken to a storage area for dehumidification before extraction from the nesting blocks. After extraction the individual cells are dehumidified more to prevent spoiling. They are then stored at 30-50 degrees F. for the winter to prevent premature hatching. Sixteen to twenty days prior to field placement, the cells are placed in hatching trays and the temperature is adjusted to 86-90 degrees F. After this incubation period the mature bees are released in the blooming alfalfa fields to begin their work of pollinating the crop. As the crops are pollinated the cutter bees begin nesting again. This life cycle occurs annually.

Managing bees constitutes a major portion of the cost to alfalfa seed growers, because nesting bees must be provided with shelters containing suitable nesting material, consisting of wood, paper, or polystyrene boards containing thousands of nest holes (7/32 to1/4" in diameter and 2 5/8" deep). Nest boards, as well as bees, can be purchased from a number of commercial sources in the United States and Canada.

For example, for a five acre field, one shelter, containing 28 nesting blocks, is positioned on the edge of the field. The alfalfa should be in the early stages of bloom when the bees are released. By fall the bees work is finished, the alfalfa seeds are mature and ready to be harvested. The alfalfa seed is the primary income for the farmer. Often times the farmer is able to earn a second, smaller income with the producing of the leafcutter bees. The leafcutter bee market at present time (2004) is much lower than it was about twenty years ago. These bees are sold in gallon containers; that container holds about 10,000 bees.

Lessons:

1. The teacher will need to download the slide show from the web site listed above. This slide show shows the entire life cycle of the leafcutter bee in great detail. It would be best to download and save to a disk or CD for a better presentation. The teacher will need to preview this slide show to prepare a discussion for the class presentation. There are slides on honey bees as well on this show. Depending on your unit, you may choose to compare and contrast the two types of bees. The teacher should be prepared for an appropriate grade level discussion.
2. The students will role play the duties of the leafcutter bees. The teacher will provide the nesting block made from the shoe box filled with half-length toilet paper rolls. There will need to be more than enough rolls for each student to have one. Explain that the bees choose and remember which cell is theirs and work to fill it. As the bee works to fill its

cell it is doing its primary job of pollinating the flowers of the alfalfa plant. While collecting pollen and nectar from the flowers, the actual pollination takes place, thus allowing the plant to produce alfalfa seeds. The teacher will have taped the inside end of the tubes shut. The "bees" will tear little pieces of green tissue paper from the "field" (representing the bites of leaves) and stuff them into the bottom of their cell (enough to cover the bottom). Then the bees will make many trips out into the field to collect little bits of yellow cotton ball (representing the pollen) and put a layer of "pollen" over the "leaves". Then the bee will collect "nectar" (represented by blue play dough). Next the egg is laid on the nectar. Finally the bee caps this cell with more small pieces of green paper. At this point the teacher will put a round disk, the diameter of the tube, inside the tube before the child builds their second cell. In real life the cutter bee just starts another cell. The teacher will then explain the rest of the life cycle process (refer to background information).

Extended Lesson:

3. The farmer needs to raise or purchase leafcutter bees according to his (alfalfa) acreage. He needs approximately 3 gallons of bees per acre. There are about 10,000 larva cells in a gallon, each being a little less than ½" in size.
4. The teacher will provide a gallon jar, numerous one cup measurers, and a lot of beans. Point one that since ten-thousand would be too hard to count, groups of children will count out tens- then 100's into the one cup measurers. The number in a one cup measurer needs to be recorded and figure sixteen cups in a gallon. Spread the beans out and tell the children that three times this many bees would work on one acre of alfalfa collecting pollen and nectar. An acre is about the size of a football field.

Assessment:

Through discussion, the children will be able to tell the primary purpose of the leafcutter bee and discuss the life cycle of this bee.

PIG FARMING

Grades: K-3
Subjects: Art, Language Arts, Math, Science, and Social Studies
Montana Standards: Art1, Literature1&5, Reading1&4, Speaking1, Writing1&2, Math1&2, Science1&3, Social Studies1, Language1&3
Approximate Time: Three 30-45 minutes

Objectives: Students will

- Learn about pig farming.
- Find out about the pig family.
- Discover there are many different breeds of swine.

Materials Needed:

- Stories
- Video
- Plastic pig
- Scissors
- Glue
- String
- Pipe cleaners
- Hole punch
- Poster paper
- Cardboard tubes
- Paper bags

Keywords:

Pork, breeds, hogs, pigs, swine, sow, boars, farrow, litter, herd, weaning, piglets, sty, pigpen, omnivorous

Brief Description:

On many Montana farms, pigs are kept in sheds to protect them from the cold. Some pig farms keep the pigs indoors throughout their lives and the growing conditions are carefully controlled. Pigs are excellent mothers and give birth to a litter twice a year. Each litter averages seven to eight piglets but as many as 10 to 12 are common. There are eight main types of pig breeds: Berkshire, Duroc, Yorkshire, Poland China, Hampshire, Chester White, Spot, and Landrace.

Lesson:

1. Introduce "Jasper", AMS plastic pig. Discuss the difference between a pig and a hog. Ask, "How would you take care of a pig?" Discuss what pigs might eat and what they need to stay healthy. Record responses on a pigpen-shaped poster. Watch the video, "Montana Country: Cattle, Sheep, and Pigs" and read Life On A Pig Farm by Judy Wolfman. Review and compare the care of pigs. Ask, "How is a pig similar us?" Introduce the word "omnivorous". Teach the students the finger play, "This Is The Farm". Students read, discuss, do the activities, and color Learning About Pork, pages 1-6.
2. Read the story Pigs to review the eating habits of pigs and the production of a new litter of piglets. Teach students "The Farmer in the Field" singing game. Then sing, "Five Little Pigs", and do the finger play, "Eight Pigs". Review pig vocabulary. Students will make a "Pig and Piglets Mobile" or make a "Pig's Home".
3. Display "Jasper" and show pictures of the different American breeds of swine (pictures in 4-H Swine Production booklet and The Pork Industry Progress pamphlet- AMS). What breed of swine is "Jasper"? Students will do "Pig Breeds" page 8 of Fun With Pork.

Extended Activities:

1. Read My Pigs by Heather Miller. Each student craft a paper tube pig or paper bag pig and write a story about their pig.
2. Share the story Small Pig by Anita Lobel. Play "Pigs in the Mud": Cut a mud puddle shape from brown construction paper. Give each child eight Mini Pigs and a piece of paper on which to write math facts. Tell the a child to toss the pigs and then write on his/her paper "_____ pigs in the mud + _____ pigs on dry land = 8." Change the number of pigs as needed to reinforce the number facts being taught.
3. Play the game, "Swapping Farms".
4. Take a field trip to a local pig farm or invite a swine producer to the classroom to show a piglet and tell how to raise pigs.

Assessment:

1. Students make a Pig "Graduated Pages" Book to show how to care for pigs.
2. Students play the "Pig Vocabulary Mix and Match" game to review their knowledge about pig farming.
3. Play the "Pig word game", (Fun With Pork, page 14).
4. Play the dot game, "Pigpen", to review the facts about pigs. Draw 25 dots on a wallboard. Divide the class into two teams, Team 1 and Team 2. Taking turns, ask a team member a question. If he answers correctly, he connects any two dots on the grid. If he answers incorrectly, the question goes to the opposing team. The object of the game is to complete a box, or pigpen. Each time a team completes a pigpen, write the team's number inside it. The team with the most pigpens at the end of the game wins.

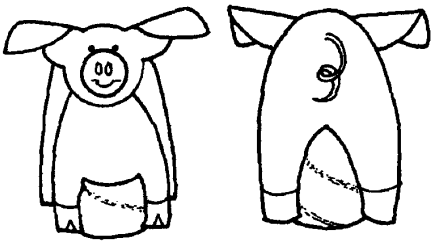
Teaching Resources:

1. "Pig and Piglets Mobile", T- 183/T-184, AMS Treasure Chest K-3 Resource.
2. "Glossary – Farm Animals", T-63, AMS Treasure Chest K-3 Resource.
3. Paper Bag Pig, T-49/T-52, AMS Treasure Chest K-3 Resource.
4. Pigs color page, S-42, AMS Treasure Chest K-3 Resource.
5. Learning About Pork, National Pork Producers Council, AMS Treasure Chest.
6. Mini Pigs – Crystal Springs Books, www.crystalsprings.com, or 1-800-321-0401, package of eight - product # 8163 - AR
7. Fun With Pork – activity book, WPPA, AMS Treasure Chest K-3 Resource:
    - Dot to dot pig - page 5
    - Pig breeds - page 8
    - Color Page Pig - page 19
8. "Jasper", plastic pig – Breyer Animal Creations, AMS Treasure Chest
9. 4-H Swine Production, MSU Extension Service, Bulletin 1198
10. "Montana Country: Cattle, Sheep, and Pigs", 12 minute video, AMS Treasure Chest.
11. Pigs by Gunilla Ingves
12. My Pigs, Heather Miller, AMS Teacher Resource Library.
13. Life On A Pig Farm, Judy Wolfman, AMS Teacher Resource Library.
14. Small Pig by Anita Lobel.
15. Baby Pig by P. Mignon Hinds
16. "Country Kids Magazine", pull-out section on pigs, December 1982
17. How to Make Books With Children Vol. 2,"Graduated Pages" book, page 93-94, Evan-Moor, 1991.
18. Color, Cut, and Paste Animal Homes, Pre K-1, "Pig's Home", page 22, Evan-Moor.
19. The Paper Tube Zoo, Grades1-6,"Pig", page 5, Evan-Moor

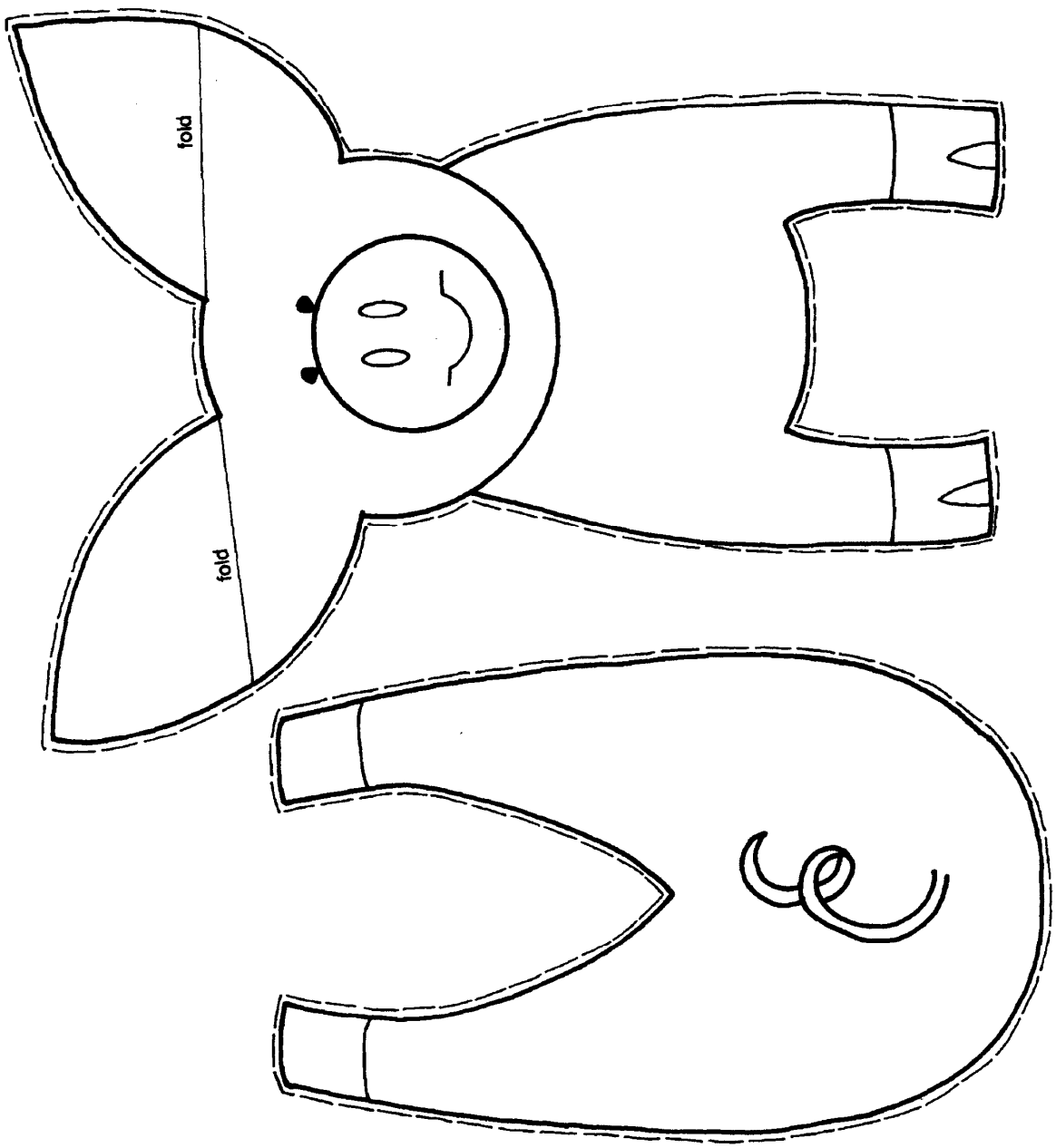
20. Field trip to a local pig farm.
21. “Pig Vocabulary Mix and Match” game, AMS Treasure Chest.
22. Animal Agriculture Myths and Facts, Midland Pork Producers, AMS Treasure Chest.
23. People On The Farm: Corn and Hog Farming, U.S. Department of Agriculture Office of Governmental and Public Affairs, AMS Treasure Chest.
24. “Pork Industry Progress” pamphlet, American’s Cut, “Swine Family Tree”, AMS Treasure Chest.
25. Songs and games from AMS Treasure Chest K-3 Resource:
    - The Farmer in the Field T-19
    - Farm Animals T-21
    - Five Little Pigs T-24
    - On The Farm T-34
    - Eight Pigs T-36
    - Swapping Farms T-47

Pig

1. Color the pig.
2. Cut out the pig body pieces and paste them on the tube.

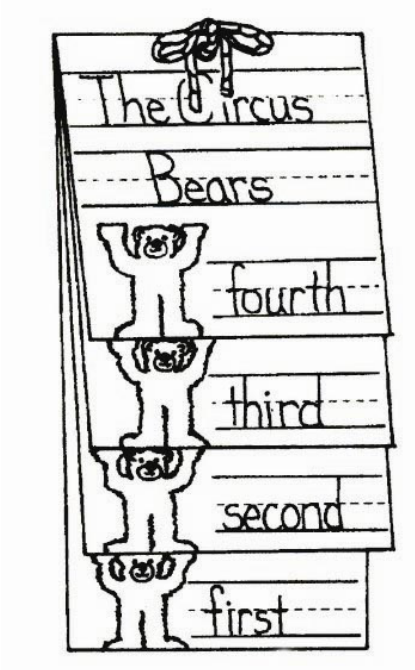


front back



”Graduated Pages” Book

A handy and easy-to-make individual mini-book
Use this book again and again.



Writing Suggestions

Cut writing paper to fit on each layer.

Use the pig pattern to retell the rhyme *This Little Piggie Went to Market.*

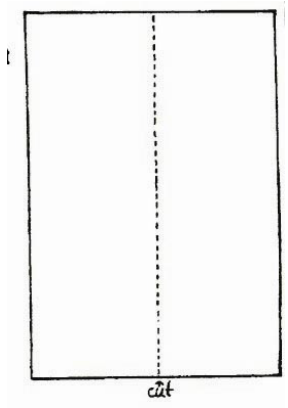
Paste ice cream cones on each level to practice counting by 2, 5, and 10.

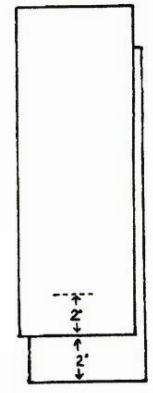
Review ordinals by counting the first, second, third, and fourth bear.

Paste a good book sticker on each level and record what you’ve read.

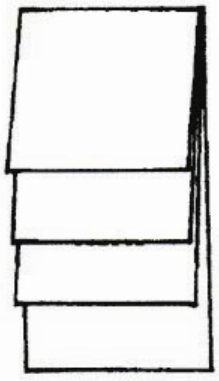
Steps

1. **Begin with a sheet of 12” x 18” (30.5 x 45.7 cm) construction paper.**

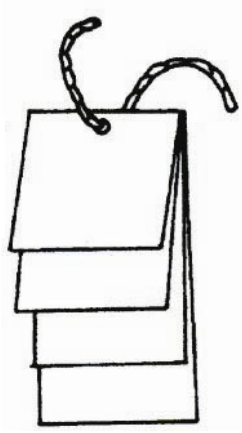


2. 

Lay the 2 pieces together with the bottom one 2” below the top. Mark 2” up on the next layer.

3. 

Fold the top over to the 2” mark. Press a fold at the top.

4. 

Punch a hole and secure with a yarn bow.

PIG OUT ON PORK FACTS

Grades: K-3
Subjects: Language Arts, Art, Science, and Social Studies
Montana Standards: Art1, Literature1&3, Media2, Reading1&2, Speaking2, Writing1-3, Library1&3, Science 1&3, Social Studies1; Language1&3
Approximate Time: Four 45-60 minutes

Objectives: Students will

- Learn the parts of a pig.
- Discover unusual facts about the pig.
- Have a "Pig Out Day".

Materials Needed:

- Poster paper
- Sticky tabs
- Small bucket
- Tape recorder
- Reference books
- Pink cupcake papers
- Rubber bands
- Toilet paper cardboard rolls
- String
- Hole punch
- Black markers
- U.S. map
- Video
- Pig stories
- Paper plates
- Sandwich ingredients
- Pink lemonade
- Plastic knives

Keywords:

Snout, jowl, front leg, knee, pastern, forearm, forerib, fore flank, belly, rear flank, hoof, dew claw, rear leg, hock, stifle, ham, tail, rump, loin, back, shoulder, neck, ear, eye, face, bristles

Brief Description:

Pigs are mammals with bristly hair that thinly covers their bodies. It is commonly said that they are stupid and dirty. Not True! Pigs have a high animal I.Q. and are smarter than horses, cows, or elephants. Pigs are unlike other livestock in that they don't have to be rounded up like cows or sheep. Pigs will come running, but only to a particular call. They are really clean animals. Pigs cannot sweat when it is hot, so wallowing in wet mud or cool water helps them lower their body temperature. Pigs can become pets and the favorite is the Pot Belly Pig.

Lesson:

1. Give a pig call…SOO-ooeyy! Explain how the call gets the attention of pigs, but that one call does not work for every pig. Each group of pigs will recognize their producer's call. Teach the students three or four calls. Tape-record the students practicing their pig calls. Display a large "Pig Parts" diagram poster (page 17, Fun With Pork) without the labels. Make sticky tab labels for the pig's parts and place all folded tabs in a bucket. Play a "Pig Parts" game to learn the parts of a pig. At each turn, while a player draws a tab from the "slop" bucket and tries to find that part of the pig on the chart, the other players will give

pig calls until the tab is placed on the chart. When the "slop" (tabs) is gone, discuss and review the parts of the pig.

2. The pig's snout is used to root or dig for vegetable roots, one of their favorite foods. Each student craft a "pig snout" with half of a toilet paper cardboard roll, one pink cupcake paper, and string. Put the cupcake paper over one end of the paper roll and wrap the rubber band in place to hold the cupcake paper. Punch holes on each side of paper roll to attach string. Then using a marker, draw nostrils on the pink cupcake paper. Teach the finger play, "Pigs" and students can wear their "pig snouts" while acting out the finger play.
3. Using "The Pig Book" idea (T-66 AMS), make an "All About Pigs" book with paragraphs of true and unusual facts about pigs. Ask students to wear their "snouts" to *root out* interesting pig facts from reference books and "Wallowing in the Facts" or "Short Snoots".
4. Celebrate pigs by having a "Pig Out Day". Wear pink, drink pink lemonade, and make "Funny Face Pig Sandwiches". Sing pig songs (list in "Pig Farming" lesson plan), read pig stories, and write pig poetry. Have fun creating piggy puns. Students can use a dictionary to hunt for pun opportunities using the word "pig" or "hog". ("pignic", "Pig Dipper", "hog-wild", "pig-me-up") Have students illustrate their new words and make a class "Pigtionary".

Extended Activities:

1. In groups of 4 (3 pigs, 1 wolf), have children make paper plate pig or wolf puppets and tie string to make necklaces. Read <u>The Three Little Pigs</u> by Peter Seymour. (Or version of choice.) Follow up by reading a twist to the original story: <u>The Three Little Pigs and the Fox</u> by William Hooks or <u>The True Story of the Three Little Pigs</u> by Jon Scieszka. As a story is being read, have the students act out the movements with their pig and wolf puppets. Compare story plots.
2. Play the game, "Animal Chase".
3. Complete the "Pork Producing States" activity. Update the map by researching the leading pork producing states and label with a pig drawing.
4. Watch the video, "Dairy Farms, Pig, Poultry Trivia".
5. Have fun reading pig tongue twisters. Students write pig tongue twisters, trade with someone and practice reading each other's tongue twisters.
6. Read pig jokes and then write a pig joke. Share jokes as a group sitting in a circle-pigpen.

Assessment:

1. Reproduce the "Pig Parts" diagram without the labels. To check knowledge, have students label using a list of pig parts words.
2. For journal writing, tell why a pig would make a good pet.

Teaching Resources:

1. "The Pig Book", T-66, AMS Treasure Chest K-3 Resource.
2. "Swine"-facts and activities, S-43/S-44, AMS Treasure Chest K-3 Resource.
3. <u>Pork Education Handbook</u>, National Livestock and Meat Board, AMS Teachers Resource Library.
4. "Pigs" – finger play, T-37, AMS Treasure Chest K-3 Resource.
5. "Animal Sounds" – song, T-23, AMS Treasure Chest K-3 Resource.
6. "Animal Chase" – game, T-48, AMS Treasure Chest K-3 Resource.
7. Contact 3-2-1 "Dairy Farms, Pig, Poultry Trivia", 28-minute video, AMS Teacher's Resource Library.

8. "Agriculture Connections", Rebecca Baker, AG in the Classroom, p. 3 - Lasting Lessons – Positively Pigs: "Wallowing in the Facts", AMS Treasure Chest.
9. Animal Agriculture Myths and Facts, AMS Treasure Chest.
10. Charlotte's Web by E.B. White
11. The Three Little Pigs by Glen Rounds (or version of choice)
12. "Munch Montana Focus On Pork", AMS Day Mailing, March 1995
13. "Short Snoots" – activity poster, Midland Pork Producers, AMS Treasure Chest or AMS AG Day Mailing March 1995:
    - Puzzle (pig) Picture
    - Tongue Twisters
    - Did You Know?
    - Pig Jokes
    - Draw A Pig
    - Recipe: Funny Face Pig Sandwich
14. Fun With Pork, an activity book, WPPA, AMS Treasure Chest:
    - Hidden Picture - corn page 3
    - Pork Producing States page 11
    - Pig Word Game page 14
    - Pig Parts page 16-17
    - Word Hunt page 7
    - Pork Industry Terms page 9
    - Pig Glossary page 20

THIS LITTLE PIGGY WENT TO MARKET...

Grades: K-3
Subjects: Art, Language Arts, Health, Math, Science, Media, and Social Studies
Montana Standards: Art1, Media1&3, Library1&3, Reading1&4, Speaking1&2, Writing1&4, Health1&5, Math2&5, Science1, Language1&3, Social Studies 1&5

Objectives: Students will

- Discover the difference between feeder pigs and market hogs.
- Explore pig products and by-products.
- Learn the importance of pork in our daily lives.

Materials Needed:

- Story
- Song
- Poster paper
- Worksheets
- Food ads
- Reference books
- Pork snacks
- Live pig

Keywords:

Feeder pigs, market hogs, lean pork, butcher, loin, sausage, pork chops, lard, ground pork, bacon, spare ribs, ham, pork steak, pork roast, pigs feet, pigs knuckles, chitterlings, meat inspector, by-products

Brief Description:

American farmers raise 100 million pigs each year. A six-month-old pig weighing 220 pounds is ready for market. One market hog could furnish a family with about 20 pounds of bacon, 30 pounds of ham, 30 pounds of pork chops, and 80 pounds of other meat. Nearly every part of the pig is used for pork products or by-products. Approximately one-half the value of a pig comes from the ham and loin. Pork is the world's most widely eaten meat.

Lesson:

1. Sing "To Market, To Market" and color a picture of a fat pig. Play "This Little Pig" and compare the different pigs by asking "Why did only one pig go to market."
2. Discuss the difference between feeder pigs and market hogs. Have students work the maze, "Pork From Farm to Your Home".
3. Students discuss and complete the Agriculture Activity Color Book page 37 and Pork Puzzlers. "Pork Jumble" activities about the pig and its meat products. Brainstorm a list of pork meats on a large poster labeled Pig Products.
4. Have the students research in the encyclopedia to find out what unusual parts of the pig are eaten and add those to the list.
5. Introduce the story, The Case of the Purloined Pork by Anita Gustafson. Have the students listen to find out what "purloined pork" means and identify pork meats mentioned in the story.
6. Explore the pork industry phrase "Everything but the Oink!" Explain that the pig provides many useful by-products, some of which are for medical and industrial purposes. Working

in teams, students will research pig by-products. On the back of the pig products poster have students list the Pig By-Products.

Extended Activities:

1. Play the game, "Driving The Pig To Market".
2. Bring a live pig or piglet to class and measure it. As a class, estimate the length, height, and weight. Then measure as accurately as possible. Write all the various measurements on the board. Have the students draw the pig to size of measurements. Try weighing the pig or have the actual weight to compare with the estimate.
3. Each student will pretend to be a Montana grocer. Feature pork as the week's special. Using food ads and pictures from magazines, students can create a poster to persuade shoppers to buy their pork products.
4. Have students collect pig by-products to design a display for the classroom.
5. Make caterpillar sandwiches or serve unusual pork samples (pigs feet, etc…) and invite guests to taste the snacks. Students love to share their pig products.
6. Color, cut, and play the story game "Can You Find My Breakfast?"
7. Students read and work pages 7-14 in Learning About Pork. Stress pork is an important part of a healthy diet.
8. Teach the song "Ham and Eggs" and "Making Breakfast". Then make a "Sunny Side Up" class booklet. Have each student describe "How to Make Breakfast" using at least one pork ingredient.

Assessment:

1. Assign "Pork parts" (page 6, Fun With Pork) to review and match the part of the pig to the meat that it provides.
2. Have students explain the meaning of "Everything but the Oink!".
3. Students write a paragraph summarizing the importance of the pig in our life.

Teaching References:

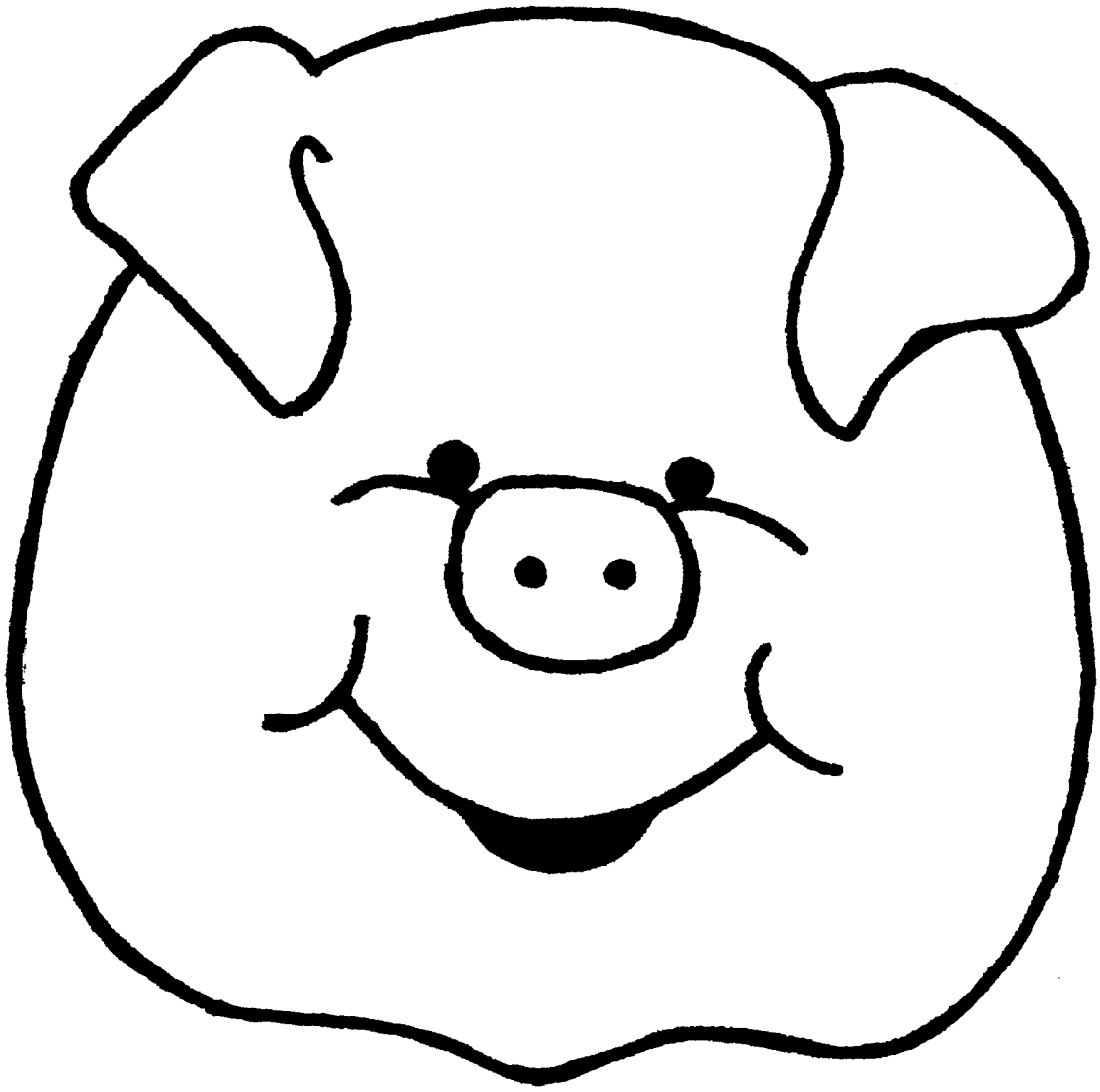
1. "Crop and Livestock Products", T-105, AMS Treasure Chest K-3 Resource.
2. "Sunny Side Up" booklet, T-69, AMS Treasure Chest K-3 Resource.
3. "Ham and Eggs"—song, Wee Sing in the Car, page 43.
4. Learning About Pork, pages 7-14, AMS Treasure Chest.
5. Agriculture Activity Color Book, page 37 (food from pigs).
6. Pork Puzzlers, page 2 "Pork Jumble", AMS Treasure Chest.
7. "Swine" facts, S-43/S-44, AMS Treasure Chest K-3 Resource Guide.
8. "Pork Industry Progress" pamphlet, "Everything but the Oink!", AMS Treasure Chest.
9. The Case of the Purloined Pork by Anita Gustafson, AMS Treasure Chest.
10. Animal Agriculture Myths and Facts—page 19, Medical contributions and products, AMS Treasure Chest.
11. AMS AG Day Mailing, March 1995, Focus On Pork:
    - History, page 5
    - The Grocery Bag, page 5
    - The Pork in a Pig, page 6
    - Hog Production, page 6
    - Pork By-Products, word search, page 7
    - Why a Hog's Not All Chops, page 7
    - Recipes: Pizza Muffins, Zippy Celery Sticks, Funny Face Pig Sandwich, page 8

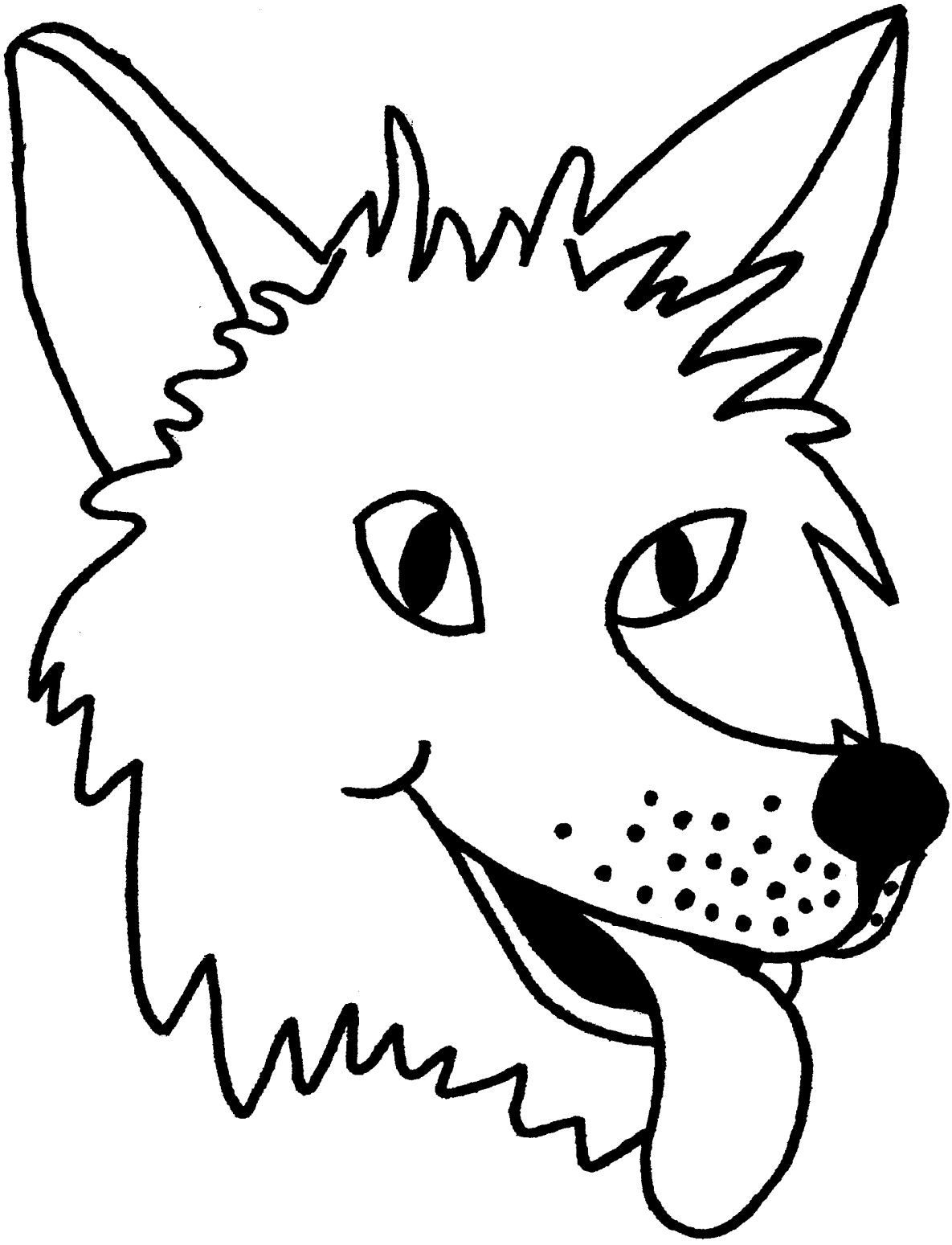
12. Fun With Pork—activity book, AMS Treasure Chest:
    - A Quick and Easy Recipe: Dippity Do-Dads, page 4
    - Pork parts, page 6
    - Pork Industry Terms, page 9
    - Caterpillar Sandwich, page 12
    - Pork From Farm to Your Home, page 15
    - Work Find—Pig By-Products, page 18
    - Color in the shapes (pig), page 19
    - Pig Glossary, page 20
13. Songs, finger plays, and games, AMS Treasure Chest K-3 Resource:
    - To Market, To Market—song, T-20
    - This Little Pig, T-36
    - Driving The Pig To Market—game, T-48
    - Making Breakfast—song, T-174
    - Can You Find My Breakfast? Action problem solving story, S-40/S-41

CHARACTER PAPER PLATE NECKLACE

Pink—Pig
Brown—Wolf

1. cut and glue characters to back of paper plate.
2. punch holes on each side and tie string to make a necklace.





THE INCREDIBLE EGG

Grades: K- 2
Subjects: Science, Math, and Literature
Approximate Time: 3-20 to 30 minute sessions
Montana Standards: Science 1, 2, and 3, Math 1, 2, 7 and Literature 1

Objectives: Students will

- Comprehend and respond to literary works.
- Explore the various characteristics of an egg and label the parts.
- Be able to distinguish between a raw and a cooked egg and explain the differences between a liquid and a solid.
- Count by 2's, 3's, and5's using pictures of eggs.

Materials Needed:

- Book: From Egg to Chicken by Dr. Gerald Legg
- Enough cooked eggs for each pair of students to have one egg
- Paper egg patterns for each student to have 25 cutout eggs
- Enough raw and cooked eggs for every two students
- 2 paper plates for each group.
- See worksheets in the Appendix A

Keywords:

Shell, Cell, Membrane, Fertilize, Yolk, Layers, Albumen, Nutritious, Chalazae, Poultry, Air sac, Protein

Brief Description:

The egg is nature's perfect home for incubating a chick embryo. It is covered with a shell that protects life until ready to hatch. The air sac at one end acts as a shock absorber. The white liquid is albumen and provides water for the hatching chick. The thick cord on each end of the yolk is the chalazae and holds the yolk in place. The yolk is the chick's food supply for the embryo which may develop from the white spot on the yolk if it is fertilized. The egg's white and yolk provide protein and cholesterol. Eggs are inexpensive and are used in many different ways for cooking. Most of the eggs we eat come from female chickens called layers. When you eat an egg, you are eating a single cell. People who raise hens place a nest in the hen house for the chickens to lay their eggs. If a chicken does not have a nest, they will build one. The egg is the symbol of birth, growth, springtime renewal, plentiful harvests, good luck, and hope. Eggs represent the beginning of life.

Lesson:

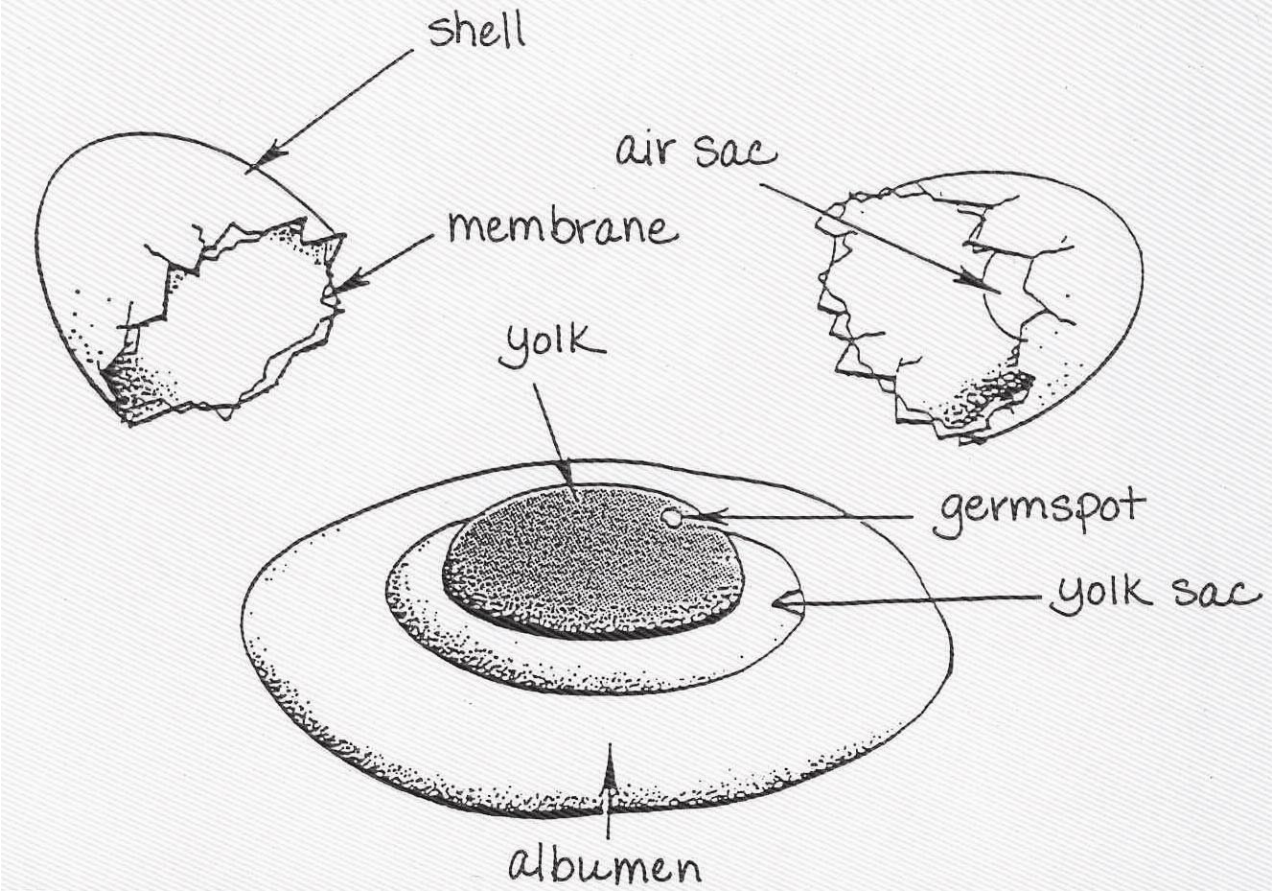
1. Inside the Egg: Read and discuss the story From Egg to Chicken by Dr. Gerald Legg. Pass out one hard-cooked egg to each pair of students. Have the students examine the e and discuss how is feels and looks. Generate as much vocabulary as possible. Peel the egg and identify the parts. Using the worksheet, label the parts correctly. For Kindergarten cut and paste the answers.
2. The Spinning Egg Trick: Give each pair of students, one raw egg and one cooked egg and two paper plates. Each student holds an egg on a plate. When told to start, each child spins its egg. Judging from the way the egg spins predict which is the raw egg and which is the cooked egg. Discuss why. Record predictions on an egg shaped chart-marked raw/cooked. The hard-boiled egg spins faster and longer because it is a soiled. The liquid in the raw egg

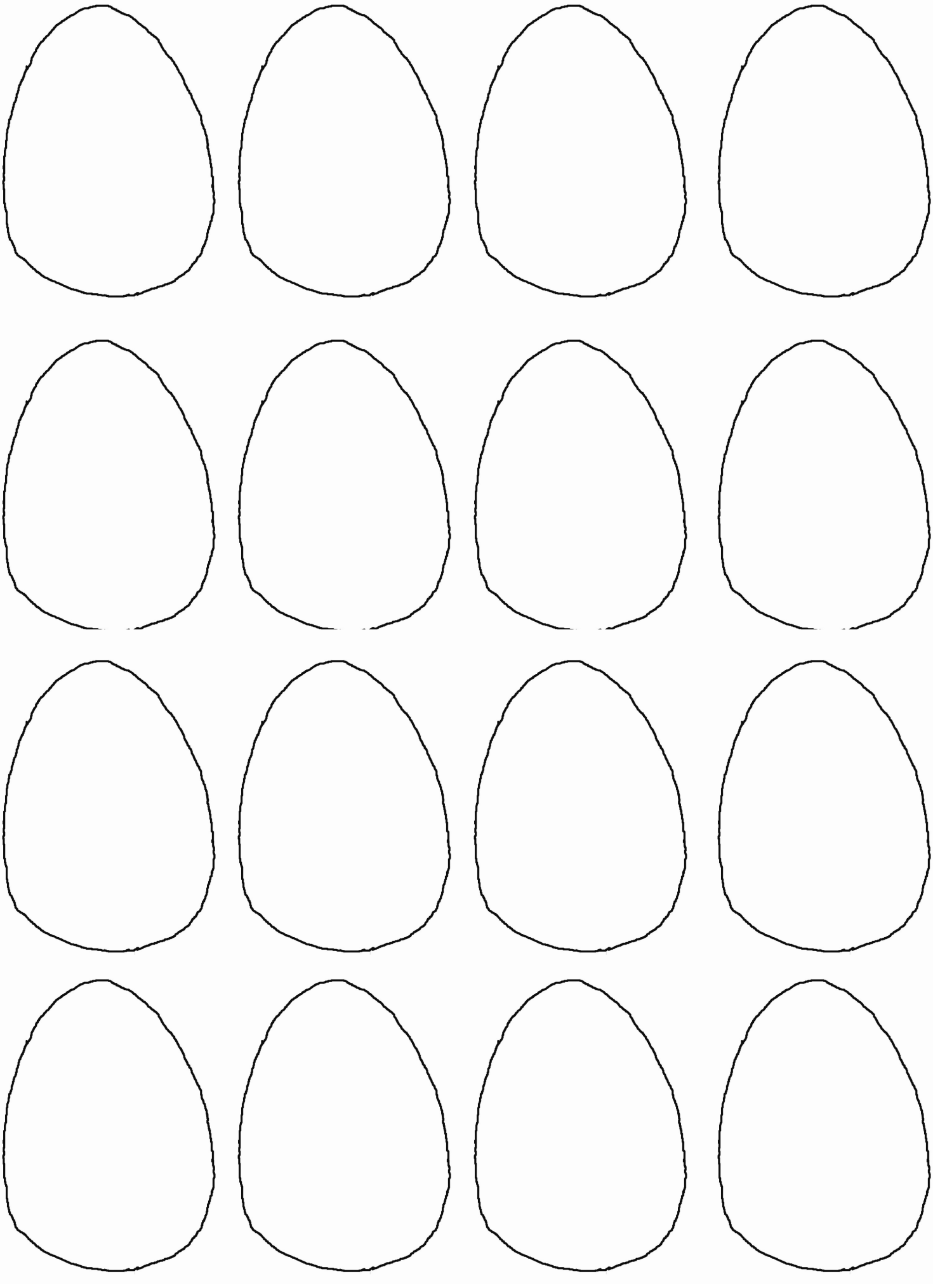
creates drag between the inside of the shell and the liquid. The drag slows down the raw egg and eventually causes the egg to stop.

3. Counts By's: Summarize the background information about chickens. Handout the paper eggs to the students. Have them cut out ahead of time. Practice building sets of 2's, 3's, and 5's. Then discuss the different ways of counting. Pass out the paper eggs. Have the students practice counting by 2's, 3's, and 5's building the sets with the paper eggs. Hand out and discuss the worksheets for the students to complete independently.

Resources:

Too Many Eggs by M. Christina Butler and David R. Godine, Horticultural Hall, Boston
Green Eggs and Ham by Dr. Seuss, Random House
The Talking Eggs by Robert D. San Souci, illustrator Jerry Pinkney, Dial Books for Young Books for Young Readers, a division of Penguin Books





CHICKENS
THE LIFE CYCLE

Grades: K-3
Subjects: Literature, Science, and Social Studies
Montana Standards: Literature 1, Science 3 & 6, Social Studies 3
Approximate Time: 3-20 minutes sessions

Objectives: Students will

- Be able to identify the parts of a chicken
- Interpret and respond to literary work
- Become aware of the life cycle of a chicken

Materials Needed:

- From Egg to Chicken by Dr. Gerald Legg
- See worksheet also in Appendix A
- Baby bird story worksheet

Keywords:

Layhouse, cheeping, grains, egg tooth, broiler, comb, layer, embryo, albumen, feathers, brooding, egg, yolk, yolk sac, milo

Brief Description:

A chicken is a bird. Birds have feathers and two wings. They start life inside an egg from which hatches a chick. Chickens provide food for humans in two forms—meat and eggs. Chickens are a very efficient way to convert feed (grain) into food for people. In Montana the principal product from poultry is the egg; most broilers come to Montana from other states. During her productive years, a hen will lay one egg a day for about 40 weeks. They are then given a rest for about three weeks, and then resume laying eggs for about 21 additional weeks. Before the 1940's most people had small flocks of hens in their backyards for eggs and meat. Since then egg farmers raise hens in layhouses. These homes are temperature, humidity, and light controlled. Automatic feeds move through for the hens to eat with clean water is always close for them to drink.

Chickens are fed a balanced diet of corn, wheat or milo grains and soybean meals. Vitamins and minerals are added to their food. Most chickens eat a better-balanced meal than some humans. The goal of an egg farmer is to raise a healthier hen. Egg farmers know that they need to put the hen first.

Lesson:

1. Egg to Chicken: Read and discuss the story From Egg to Chicken by Dr. Gerald Legg. Discuss the life cycle of the chicken. Pass out the life cycle of a chicken worksheet and complete together discussing various stages.
2. Hand out the worksheet for students to label the different parts of a chicken; they can also color their chicken.

Additional:

3. Have students complete the baby bird story worksheet.

Vocabulary:

Albumen—the white part of the egg which surrounds the growing chick

Brooding—when a hen looks after her eggs by keeping them warm

Cheeping—the noise that chicks make so that their mother knows where they are

Comb—the bright red crest on top of a chicken's head

Egg—contains the baby bird

Egg tooth—a tiny tooth-like point on the tip of the beak of a newborn chick. The chick uses the egg tooth to break through the eggshell

Embryo—the early stage of a young animal before it can move and before it resembles its parents

Feathers—the soft, light, and often colorful covering of birds

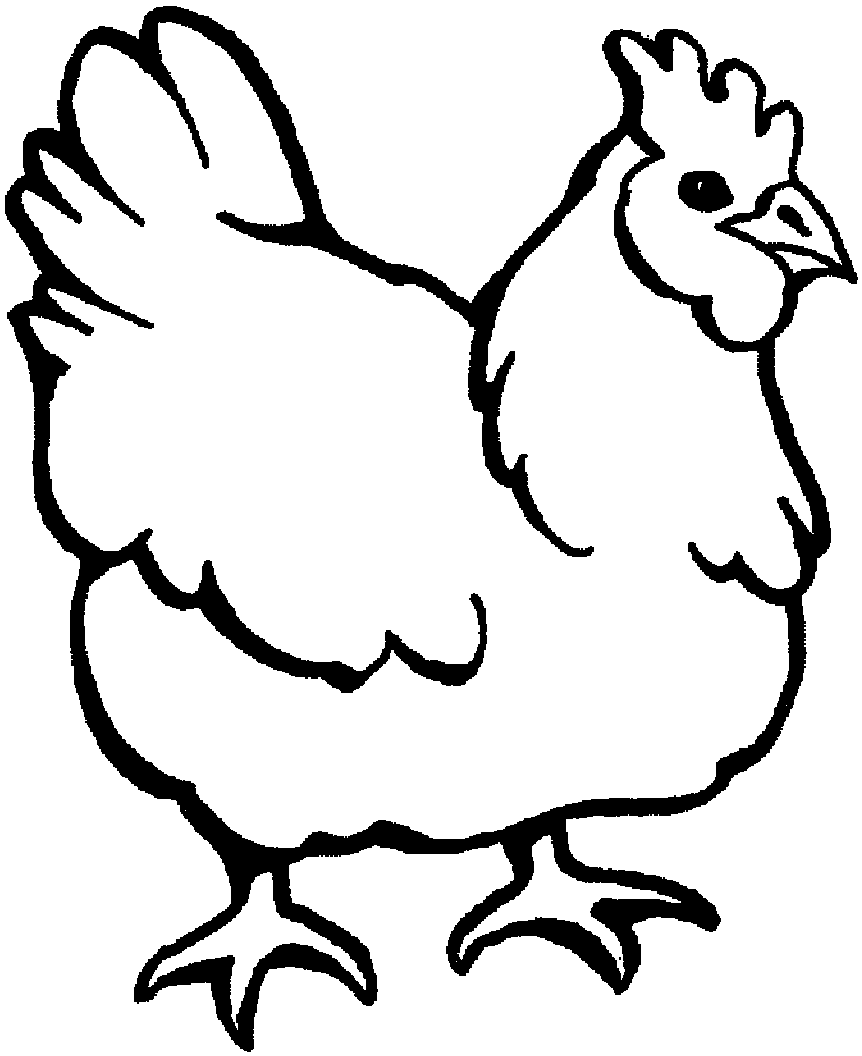
Membrane—a very thin inside covering of the egg shell

Nest—a hollow place built or used by a home to rear its young

Shell—the hard covering of an egg which protects the growing chick

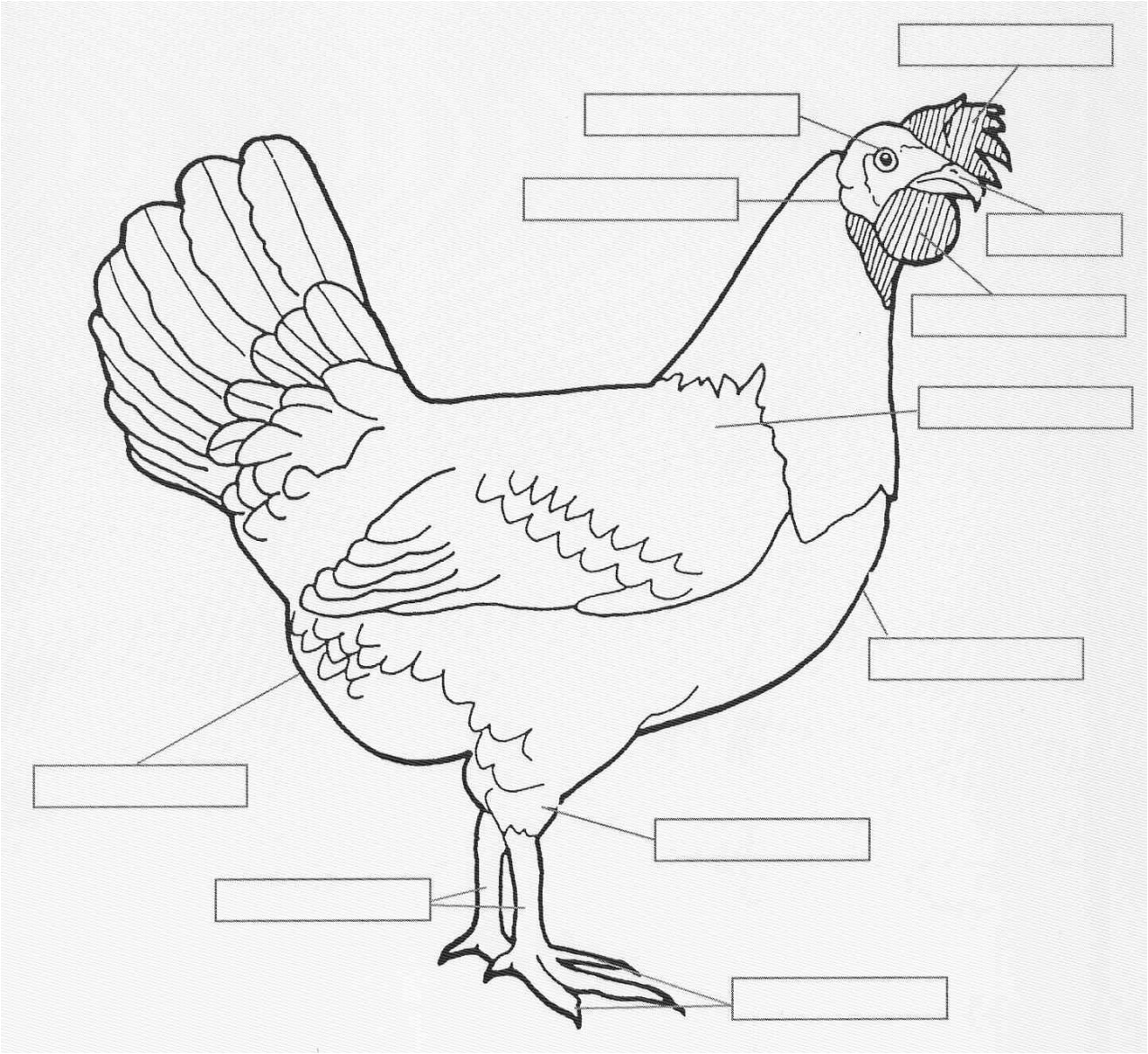
Yolk—the yellow part of an egg which is used as food by the growing chick

Yolk sac—a sack that protects the yolk



PARTS OF A CHICKEN

Color and label the parts of a chicken



Use each word only once:

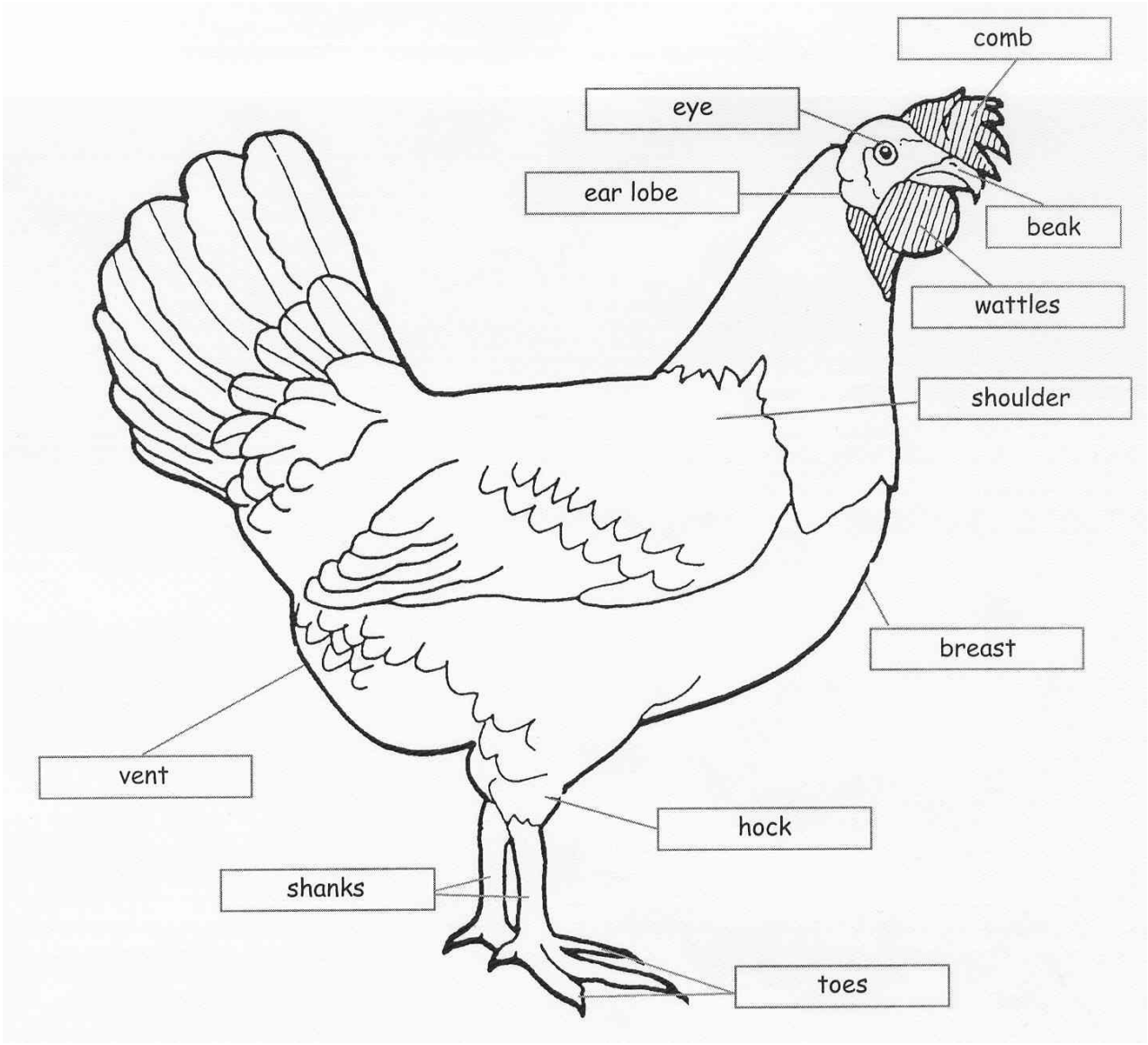
beak	breast	comb	ear lobe
eye	hock	shanks	shoulder
toes	vent	wattles	

This worksheet is part of the Incubation and Embryology Project. University of Illinois Extension, 1999.

PARTS OF A CHICKEN

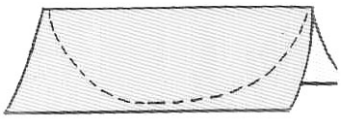
Color and label the parts of a chicken

KEY



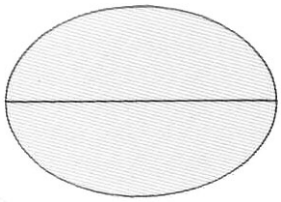
BABY BIRD STORY

A-Fold-And Cut Story

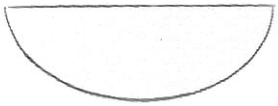


(Have ready in your lap orange 9x12 construction paper, scissors, and a black felt pen.)

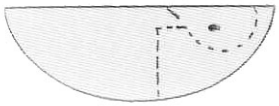
One spring day a mother bird and a father bird began to build a nest. It took them a long time because they had to carry many pieces of string and grass twigs high up into the branch of a tree. When they finally finished, it looked like this: (Fold paper in half lengthwise and cut as shown on dotted line.)



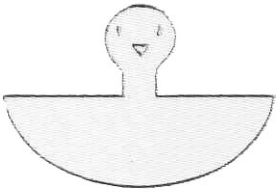
Then the mother bird sat down on the nest and laid a beautiful egg, and the egg was shaped like this: (Unfold nest and show egg shape.) The egg was far down into the nest where no one could see it. (Fold back into nest shape again.)



Now the mother bird had to sit on the egg to keep it warm. She had to sit there for an awfully long time…on hot days, rainy days, and cold days. So she was very glad when the two little black bug came along to keep her company. They had nice long talks, and that made the day more pleasant for her. (Make two black dots, one on each side of the nest, near the top, one-third of the way from the end.)



At last the time came for the egg to hatch, and the mother bird heard a crackling noise. She looked down to see that there were some cracks in the egg. The cracks got bigger and bigger. (Cut as indicated by dotted lines.) Finally, the egg broke in half, and out come…guess what? A baby bird! (Fold top part of egg down, and fold bill up slightly.)



FROM EWE TO YOU

Grades: K-3
Subjects: Language Arts, Science, and Social Studies
Montana Standards: Art 1, Literature 1, Reading 1; Spelling & Listening 1, Writing 1, Science 1 & 6, Social Studies 3
Approximate Time: 3-45 minutes

Objectives: Students will

- Learn how wool is spun into yarn.
- Construct a hand spinner and spin wool.
- Recognize the "real wool" logo.
- Learn the difference between sheep products and sheep by-products.

Materials Needed:

- Cloak/shawl
- Wool
- Empty thread spools
- Pencils or dowels
- Wool yarn samples
- Wool fabric samples
- Wool clothing: socks, sweater, pants
- Small loom
- Knitting needles
- Knitted samples
- Pure wool logo
- Story books
- Activity sheets

Keywords:

Cloak, shawl, spinning, weaving, weave, drop spindle, spinning wheel, knit, woven, loom, logo, products, by-products

Brief Description:

Sheep give us so many things. They grow wool that is sheared once a year. The wool is then cleaned and carded to make the fibers straight. Then the wool fibers are ready to be spun or twisted into yarn. The yarn is knitted or woven into cloth. Today there are machines that knit and weave the fabrics. Sheep also give us meat and many by-products from other parts of their bodies.

Lesson:

1. Display a wool cloak. Ask students to describe it and explain what kind of clothing it is. Have them explore it by touching and looking closely at the fabric. Before reading the story Charlie Needs A Cloak, ask, "Why does Charlie need a cloak and how will he get it?" Following the story, students will discuss their answers and review the process of how wool is made ready for weaving.
2. Have students work in pairs to construct a hand spinner (AMS T-84) with a wooden spool and pencil or dowel. Use wool that is clean and carded ready to spin (lesson "Some Wooly Good News!"). Students will spin wool and then display their yarn. The Source, p. 29-32, reviews the process of "wool fibers to sweater". Show woolen items such as socks,

sweater, or pants. Discuss the knitted or woven cloth and check the weave. If possible, demonstrate how to knit yarn and view woven cloth on a loom.

3. Talk about what sheep give us using Wool and Sheep Activity Book, p. 10, "Sheep Products". Using a sheep-shaped poster, record lists of products and by-products that are made from sheep. Students will make a sheep-shaped booklet to list the sheep products and by-products they have used.

Extended Activities:

1. Make a display of wool items collected by the students. (K-3)
2. Use "A Wooly Story", p. 29 (Mailbox), for sequencing wool process. (Grades 2-3)
3. Invite a spinner to demonstrate how to spin wool on a spinning wheel. (K-3)
4. Read Weaving the Rainbow and create a yarn wool weaving. (Grades 1-3)
5. Activity sheet, "Problem: How to reward sheep production in Montana's economy?" review more sheep facts. (Grades 2-3)
6. Students can collect and display sheep by-products. (K-3)

Assessment:

1. The sheep activity, "From Sheep to Sweater", pages 39-40, (Project Seasons) will help students recall steps to making a sweater from wool by sequencing pictures or props. (K-3)
2. Show students a shawl and have them read "Charity's Shawl" (AG Day Mailing). Ask them to answer the questions by matching the correct picture. Students will need to remember facts about processing wool. (Grades 2-3)
3. Using p. 25 from the Wool and Sheep Activity Book, students will review what they have learned about sheep. (Grades 2-3)

Teaching References:

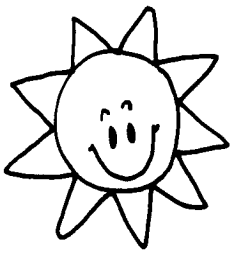
1. Wool and Sheep Activity Book, p. 10, 14-15, 25, 28, 31 – Colorado Foundation for Agriculture
2. How To Make Books With Children, p. 21 "Lamb Book" - Joy Evans and Jo Ellen Moore
3. "A Wooly Story", p. 29 – The Mailbox, April 1984
4. "Fleece to Fabric" poster, American Wool Council – AMS Treasure Chest
5. Project Seasons, P. 39-40, "From Sheep to Sweater", Deborah Parrella, 1997
6. "Problem: How to reward sheep production in Montana's economy?" p. 26, Agriculture and Water Activity Book – WIFE (Montana Women Involved in Farm Economics) – AMS Treasure Chest
7. Charlie Need A Cloak, Tomie de Paola – AMS Teacher's Library
8. Weaving The Rainbow, George Ella Lyn and Stephanie Anderson
9. "Wool From Sheep To You", section called "Spinning Yarn", p. T-84 – AMS K-3 Resource Notebook
10. "Charity's Shawl", p. 8, - AG Day Mailing, January 1997 (Grades 2-3)
11. The Source, p. 29-32, Elizabeth Wolanyk – AMS Teacher's Library
12. "Sheep Products Find Many Uses/Americans Appreciate Sheep Products", American Sheep Industry – AMS Treasure Chest
13. "Just A Few Products Brought To You By Sheep", American Sheep Industry – AMS Treasure Chest
14. "Wool Information: Woolen Products and Types of Woolen Fabrics", p. WS-256 – AMS Treasure Chest
15. "ASI Sheep Reporter" – AMS Treasure Chest

A WOOLY STORY

Read the story. Cut and paste the sentence strips below in the correct order.

In the spring, Charlie shears the wool off his sheep. First, he washes the wool and then cards it to straighten it out. He spins the wool into yarn. He dyes the wool with berries to make a cloak.

Paste sentences in correct order.



1

2

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4

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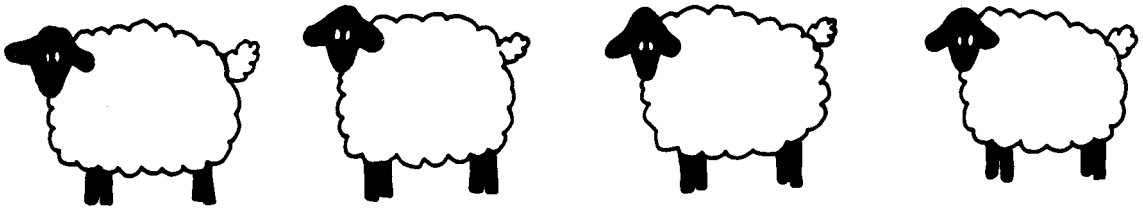
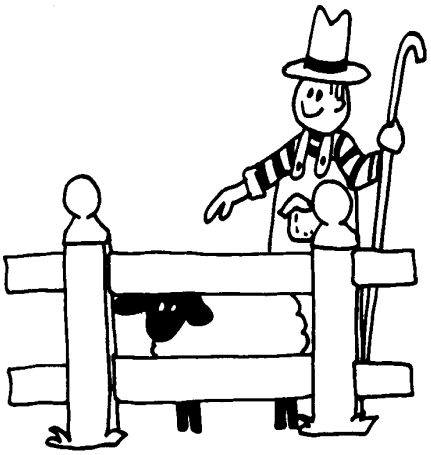


Cut.

He spins the wool into yarn.
Charlie washes his wool.
Charlie shears the wool off.
Charlie makes a new cloak.
Next, Charlie cards the wool.



SHEEP FARMING

Grades: K-3
Subjects: Language Arts, Math, Social Studies, Science, and Art
Montana Standards: Spelling1&2, Art1&6, Reading1&4, Literature1&5, Media Literacy1, Writing1&2, Math1&5; Social Studies3; Science3
Approximate Time: 4-30 minutes

Objectives: Students will

- Learn about sheep farming.
- Study the sheep family unit.
- Understand the difference between a lamb and a bum lamb.
- Explore the feed for sheep.
- Learn about sheep predators and how sheep can be protected.

Materials Needed:

- Story books
- Wool
- Bum lamb
- Bum bottle
- Lamb powdered milk
- Part of a bale of hay
- 2 Buckets
- Plastic tubs
- Stock salt
- Mineral block
- Weight scale
- Measuring cups
- Worksheets

Keywords:

Pasture, barn, sheep shed, dry lot or corral, trough, sheep jugs, herder, sheep wagon, herding, herd, flock, grazing, ewe, ram, lamb, buck, wether, bleat, twins, triplets, suckle, orphan/bum, weaned, vaccinate, docking, grain, guard animals, predators

Brief Description:

Sheep are raised all over the United States and in other parts of the world. A female sheep is called an ewe and the male sheep is called a buck, ram, or wether. A sheep that is younger than a year old is called a lamb. Sheep grow wool on their bodies to keep them warm and dry. A lamb is born with a tail, but the tail is docked (cut off) to help keep the sheep clean and healthy. They do not have any front teeth and still can eat grass.
Sheep have three extra parts to their stomach that allows them to eat and digest the grass. People and most other animals cannot digest grass because they only have one part to their stomach. (Diagrams in ASI Sheep Reporter) Sheep are important to us because they give us wool and food.

Lesson:

1. Sing "Old MacDonald Had a Farm" to introduce the story Hooray for Sheep Farming! By Bobbie Kalman. Read pages 4-19 and discuss the farm, sheep, and guard animals. Students will label a farm map (AMS: K-3 p. S-6) and include drawings of a guard dog with sheep. Have prepared a Math center with a bucket of stock salt, a bucket of grain, part

of a bale of hay, and a mineral block. Teams of students take turns in the center to first estimate weight and cup measure of the feed. Next, they will actually do the weighing and measuring. The findings will be recorded on the Math sheep sheet.

2. Students will read color book story, I Love Lambs. Discuss sheep facts and special vocabulary. Review vocabulary with work sheet "Sheep Words" p. 2 (Wool and Sheep Activity Book). Read "Welcome Baby Lambs!" p. 4-6 (Wool and Sheep Activity Book) and complete the math, comprehension, and spelling activities. If possible, introduce a visiting bum lamb, mix its milk, and feed the lamb with a bottle. Take pictures of the lamb and students to create a bulletin board display: How to Feed a Bum Lamb".
3. Sing "Mary Had a Little Lamb" and continue singing by changing the name. End with the name "Audrey" to introduce the book My Sheep by Heather Miller. Talk about the story and ask this riddle: Do you know a song that sheep can sing? (Baa, Baa, Black Sheep) Students will glue wool to worksheet p. 13: "Sheep-We get wool from sheep" and write a description of their lamb.
4. Remind students that sheep need to be protected from predators such as coyotes, fox, wolves, lions, or bears. Discuss the importance of guard animals. Conclude by making or serving the recipe "Sheep Dogs" page 7 from Spurrin' the Words.

Extended Activities:

1. Students can read: Little Rabbit's First Farm Book by Alan Baker and Little Farmer Joe by Ian Whybrow and Christian Birmingham. (K-3)
2. Color pages in the I Love Lambs color book. (K-3)
3. "Can You Solve It?" Math story problems from Wool and Sheep Activity Book p. 23. (Grades 2-3)
4. Sing "Little Bo Peep" and act out the song. (K-3)
5. Color the states that have sheep production. The United States map reference is in the ASI Sheep Reporter. (K-3)
6. Students can discovery special uses for sheep by reading p. 9 "Sheep Have Special Uses", p. 15 "How can wool help the environment?" (Wool and Sheep Activity Book). Discuss "Sheep and Noxious Weed Control" (BLM) and "Sheep are good for the world around us!" (Sheep Reporter). (Grades 2-3)

Assessment:

Students should understand and be able to describe the sheep family structure. Plan a field trip to a local sheep farm and have students keep a journal of their trip. They may use drawings and writing to describe what they have learned.

Teaching Resources:

1. K-3 Farm Map p. S-6 - AMS Treasure Chest Resource Notebook
2. "The Sheep Industry in America", American Sheep Industry Women - AMS Treasure Chest
3. ASI Sheep Reporter: All About Sheep - AMS Treasure Chest
4. Hooray for Sheep Farming! , pages 4-19, Bobbie Kalman - AMS Teacher's Library
5. My Sheep by Heather Miller - AMS Teacher's Library
6. "Montana Country: Cattle, Sheep, and Pigs", 12 minute video - AMS Treasure Chest
7. Sheep, My Good Friends On The Range coloring book – "Ewe Color It", American Sheep Industry Women

8. Wool and Sheep Activity Book, Bette Blinda, Colorado Foundation for AG, pages 2, 4-6, 9,15, 23
9. Thematic Unit: Farm Animals, p. 13, "Sheep-We get wool from sheep", Teacher Created Materials, Inc.
10. Website: www.sheepusa.org
11. Invite a sheep producer and a bum lamb to feed
12. Little Rabbit's First Farm Book, Alan Baker - AMS Teacher's Library
13. Little Farmer Joe, Ian Whybrow and Christian Birmingham - AMS Teacher's Library
14. Spurrin' the Words, a leader's guide, p. 7- Cowboy Poetry Project, 2004, MSU Extension Service
15. Wee Sing Nursery Rhymes and Lullabies, Pamela Conn Beall and Susan Hagen Nipp
16. "Sheep and Noxious Weed Control", BLM, U.S. Forest Service, Bureau of Reclamation – AMS Treasure Chest.

SHEEP DOGS

1 dozen hot dogs
6 cups mashed potatoes (instant)
2 cups shredded cheese

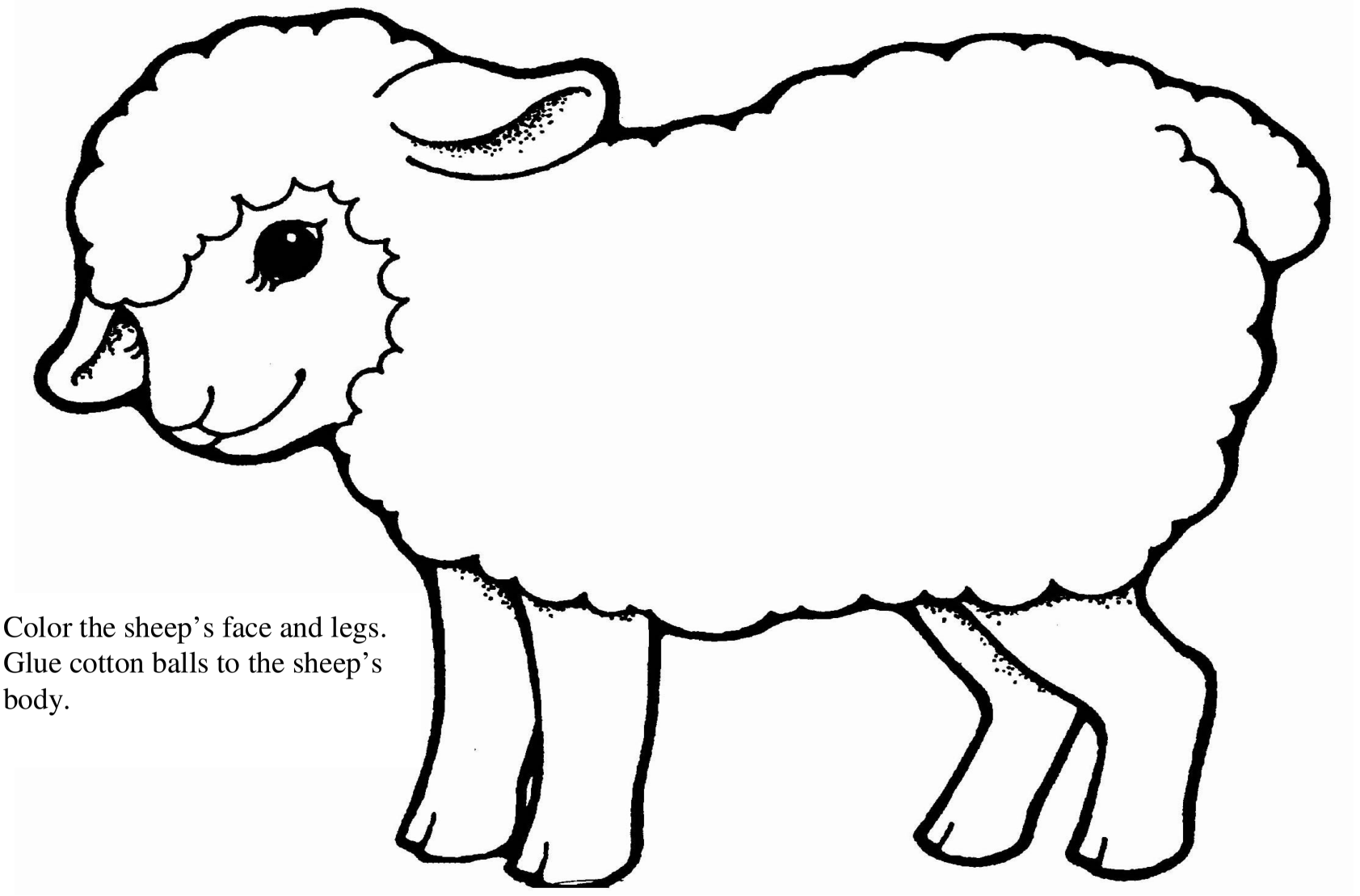
Wooly weenies are meant for the out-of-doors! For the home on the range, Sheep Dogs are the perfect snack. When you need to ride herd, get a dozen hot dogs and slice them lengthwise without cutting all the way through.

Place on a baking sheet. Spoon ½ cup of mashed potatoes into each slit. Top with cheese and bake at 350° for 20 minutes.

When the dogs are sizzling and the cheese is melted, whistle to bring everyone to the table.

Name _____

SHEEP

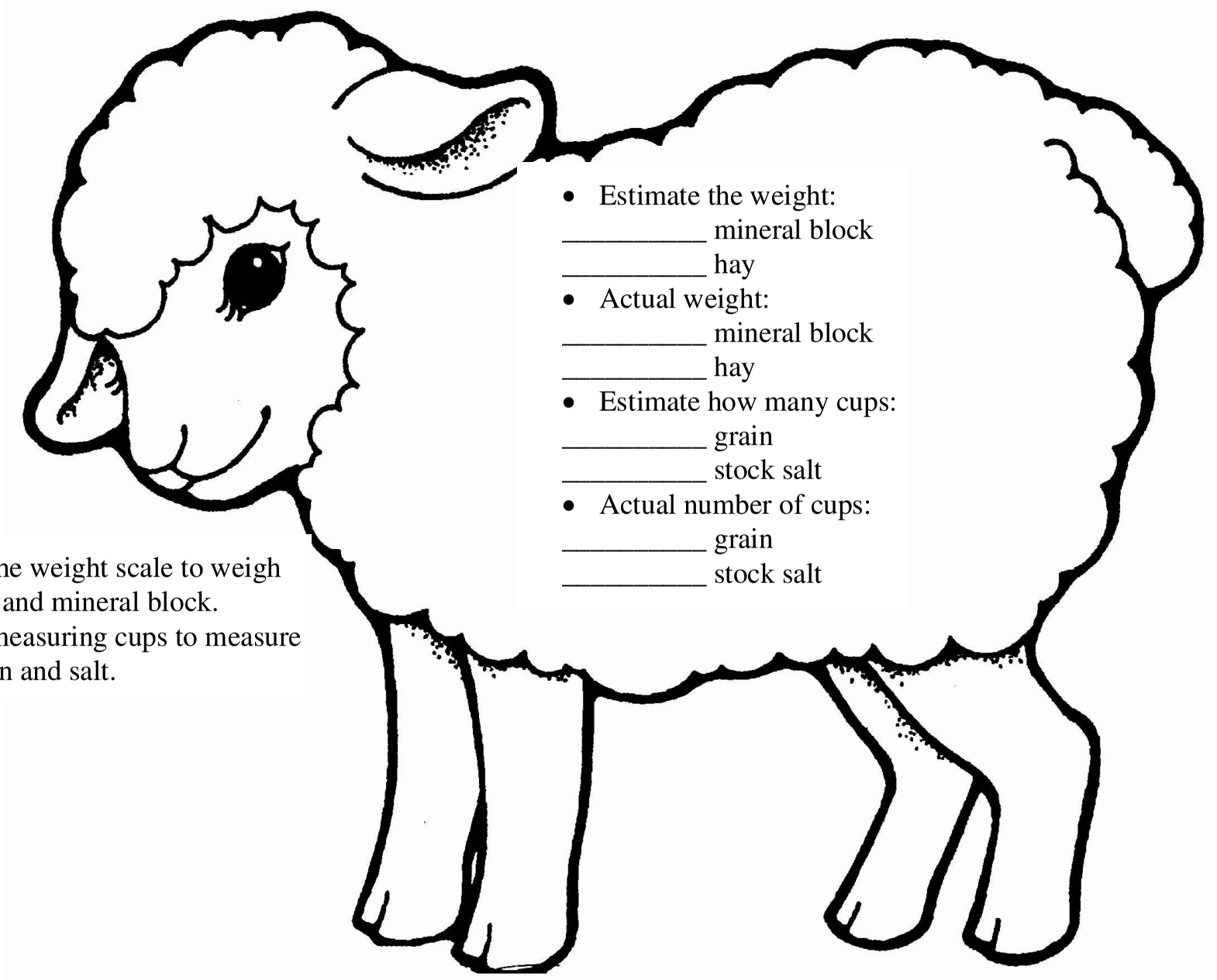


1. Color the sheep's face and legs.
2. Glue cotton balls to the sheep's body.

We get wool from sheep.

MEASURING FEED

Name _____



- Using the weight scale to weigh the hay and mineral block.
- Using measuring cups to measure the grain and salt.

- Estimate the weight:
  _____ mineral block
  _____ hay
- Actual weight:
  _____ mineral block
  _____ hay
- Estimate how many cups:
  _____ grain
  _____ stock salt
- Actual number of cups:
  _____ grain
  _____ stock salt

SOME WOOLY GOOD NEWS!

Grades: K-3
Subjects: Language Arts, Math, Science, and Social Studies
Montana Standards: Literature 1, Spelling/Listening 1, Writing 1, Math 5, Science 1, and Social Studies 1
Approximate Time: 3-30 minutes

Objectives: Students will

- Learn about wool.
- Compare and discuss wool characteristics.
- Discover how wool is processed.
- Learn why wool is an important animal fiber.

Materials Needed:

- Wool samples
- Hand magnifying glasses
- Microscope
- Rulers
- Soap flakes
- Hot Water
- Small tubs
- Wool cards
- Combs
- Paper towels
- Lanolin lotion
- Worksheets
- Wool fleece
- Shears
- Story books

Keywords:

Shears, shearing, shorn, fleece, fiber, wool crimp, scoured, picked, wool card, carded

Brief Description:

Sheep give us a natural fluffy fiber called wool that grows like hair all over the sheep's body. Most sheep are usually sheared once a year in the spring before lambing. Because there are so many different kinds of sheep, there are different kinds of wool. Wool can be white, black, gray, or red. After shearing, the fibers are graded according to length and diameter. The value of the wool is determined by how clean the wool is and the grade of wool. Next, the wool is scoured (cleaned), picked (particles removed), and carded (combed). Finally, it is ready to be spun into yarn.

Lesson:

1. Have students sing "Baa, Baa, Black Sheep". Sing it again changing the verse to white sheep. Read pages 25 to 28 from The Source by Elizabeth Wolanyk to review where wool comes from and introduce how it is processed. Discuss and if possible, share a wool fleece, shears, and a sheep card. Review comprehension and vocabulary with worksheets p.12-13, "Sheep Give Us Wool!" and "Wool Is A Natural Fiber" (Wool and Sheep Activity Book-Colorado).
2. Discuss the poster "Wool Grades and the Sheep That Grow the Wool" and AMS wool samples. Provide a wool sample and a hand magnifying glass for each pair of students. Have students compare and describe their wool fibers by color, texture (lanolin/lotion), and tightness of the crimp (springiness). Using a microscope, the students will be able to compare the diameter (width) of the fibers. Sharing wool samples, the students should try

to collect an example of fine, medium, and coarse wool. Pictures on pages 20-21 of Hooray for Sheep Farming by Bobbie Kalman will help the students reference their samples. Glue and label samples of wool on the "fleece shaped worksheet".

3. Demonstrate how to scour (wash), pick (clean), and card (brush) wool following directions in "Wool From Seep To You" (AMS p. T-84). Working in groups, give students the opportunity to process their wool. Lay the clean wool samples on paper towels to dry.
4. In conclusion: What is clean wool used for? Why is wool an important animal fiber? Do you have anything that is made from wool? Bring it to school in a "Mystery Bag" for Show and Tell.

Extended Activities:

1. "Where Wool Comes From" p.14 - Silver Burdett (K-3)
2. Have groups of three students each measure and cut 3 inch samples of wool fiber. After stretching each sample and measuring again, display the wool samples shortest (fine) to longest (coarse). (Grades 2-3)
3. Spelling Riddle: "Where does a lamb go when it needs a haircut?" (Grades 2-3)
4. Plan a field trip to watch sheep shearing.

Assessment:

Students should understand where wool comes from and how it is processed. As a group, have students discuss the coloring book (copied without the original captions), "Sheep Are My Good Friends", which reviews vocabulary and the wool processing. Assign students to color and write a description for each page. (Grades 2-3)

Teaching Resources:

1. Harvesting, Preparing, and Selling Montana Wool: p. T-97-99 K-3 - AMS Treasure Chest K-3 Resource Notebook
2. "Sheep" p. T-83 or S-53 (8-10) - AMS Treasure Chest K-3 Resource Notebook
3. "Wool Grades and the Sheep That Grow The Wool: American Wool Council - AMS Treasure Chest
4. The Source – AG in the Classroom by Elizabeth Wolanyk, pages 25-28 - AMS Teachers' Resource Library
5. Hooray For Sheep Farming , Bobbie Kalman, pages 20-31 - AMS Teachers' Resource Library
6. ASI Sheep Reporter: All About Sheep - AMS Treasure Chest
7. Wool Information and Wool Production pages WS-256, 257 - AMS Treasure Chest
8. Fact Sheets #1-8 "Processing Wool", American Wool Council - AMS Treasure Chest
9. Wool Samples - AMS Treasure Chest
10. Wool and Sheep Activity Book – Colorado Foundation for Agriculture, P.O. Box 10, Livermore, CO 80536; phone 970-881-2902
11. Fleece shaped worksheet.
12. Sheep Are My Good Friends – American Sheep Industry Women, "Ewe Color It"
13. The Teacher's Pet - The Learning Works, Inc. 1983, "Spelling Riddle" p. 92
14. Local county extension agent or sheep producer: fleece, shears, wool cards
15. Website: www.americanwool.org
16. "Wool From The Sheep To You", p. T-84 – AMS Treasure Chest K-3 Resource Notebook
17. "Do You Know The Unique Qualities Of Wool?" , American Sheep Industry – AMS Treasure Chest
18. "Where Wool Comes From", p. 14 – Silver Burdett 1982 (Textbook Chapter 4)

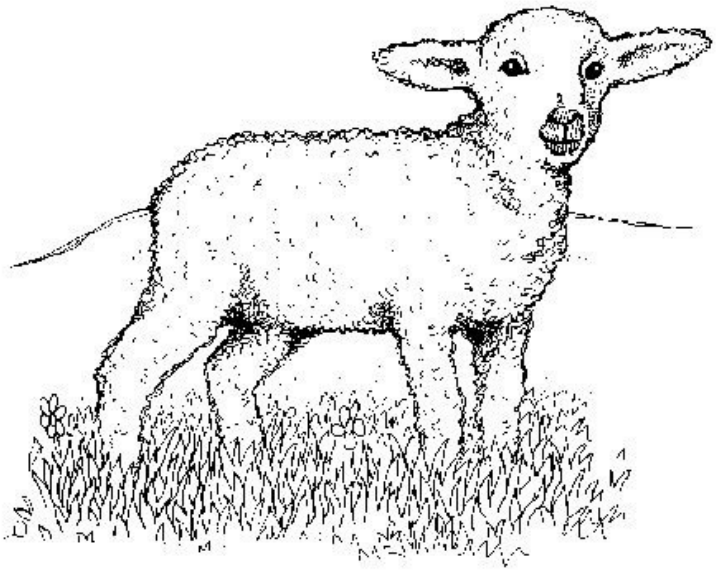
Name _____

Spelling Riddle

Find the letter in front of the correct spelling of each word, and write it on the line at the bottom of the page to solve the riddle: *Where does a lamb go when it needs a haircut?* The first one has been done for you.

1.	**s** gramar	**b** grammer	**t** grammar
2.	**o** separate	**a** seperate	**e** sepurate
3.	**r** accomodate	**t** accommodate	**e** acommodate
4.	**h** business	**n** bisiness	**o** busines
5.	**b** embarras	**o** embarass	**e** embarrass
6.	**s** miscellanious	**r** misscellaneous	**b** miscellaneous
7.	**a** familiar	**s** familar	**g** famillure
8.	**a** experience	**r** expereince	**j** expireance
9.	**n** judggment	**l** judgemint	**b** judgment
10.	**k** surprize	**a** surprise	**j** sirprise
11.	**b** occured	**y** ocurred	**a** occurred
12.	**s** necessary	**t** necesery	**l** neccessery
13.	**h** leisure	**e** leezure	**y** liesure
14.	**c** lisence	**d** licenze	**o** license
15.	**p** excellent	**e** exsellent	**a** excellant

T ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

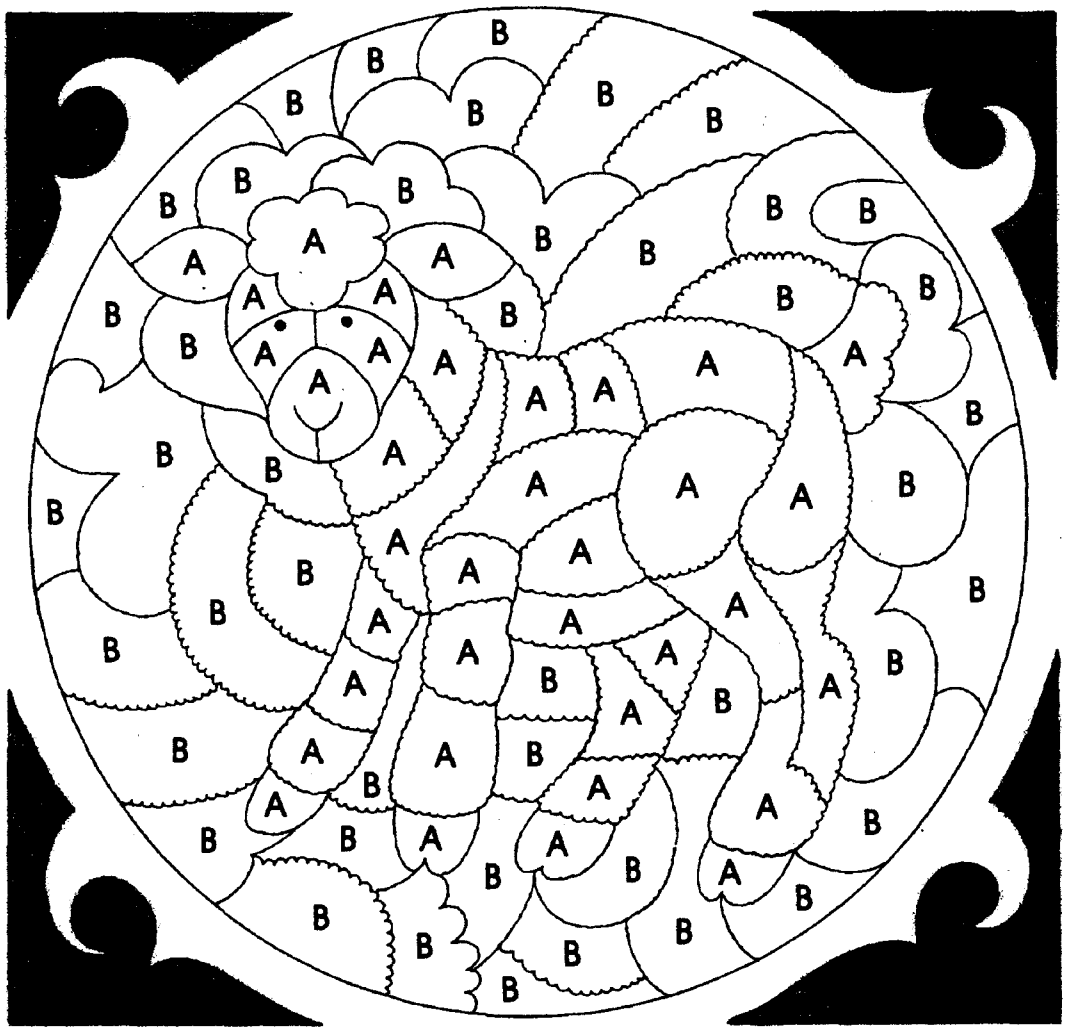


FLEECE

Name _____

WHERE WOOL COMES FROM

Some clothes are made of wool. Color the picture to find out where wool comes from. Then fill in the blank.



Wool comes from _____